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CONTENTS

FOODS AND DIETARIES: A MANUAL OF CLINICAL DIETETICS
BY R. W. BURNET, M.D.

STERTOR, APOPLEXY, AND THE MANAGEMENT OF THE APOPLECTIC STATE
BY ROBERT L. BOWLES, M.D.

INDEX OF VOL. XI.

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Medical and Surgical

MONOGRAPHS

Consisting of Original Treatises and Reproductions, in English, of Books and Monographs selected from the latest literature of foreign countries, with all illustrations, etc.

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By R. W. Burnet, M.D.

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FOODS AND DIETARIES:

A MANUAL OF CLINICAL DIETETICS.

BY

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Member of the Royal College of Physicians of London; Physician to the Great Northern Central Hospital, Etc.

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FOODS AND DIETARIES:

A MANUAL OF CLINICAL DIETETICS.

CHAPTER I.

INTRODUCTION.

A KNOWLEDGE of the physiology of digestion lies at the root of sound practical dietetics, and although it does not come within the scope of the present work to enter into a lengthy examination of different foods and their properties, or into a detailed account of the mechanism of digestion, it may be well to advert very briefly to a few points regarding foods and normal digestion.

For the present purpose foods may be grouped as (1) nitrogenous elements (albuminoids, proteids); (2) carbohydrates (starches, sugars, etc.); (3) hydro-carbons (fats); (4) salts and water.

The proper apportioning of these different elements, with due regard to the age, circumstances, and surroundings of the individual, constitutes for healthy persons a well-balanced and economical diet. Probably, however, it very seldom happens, even in health, that an exact balance is struck between the wants of the system and the amount of food that is consumed. For example, when the dietary is full and the digestive organs are vigorous, the surplus food assimilated is stored up, and increase of body-weight takes place. Moreover, even in healthy persons, some of the food taken is incompletely digested, and is thrown off in the excreta. Again, when the diet is scanty and insufficient for the needs of the system at the time, the reserves have to be drawn upon, and loss of weight is the result. Fluctuations often occur in the same individual, according to the surroundings in which he is at

the time placed as regards climate, activity, and other agencies influencing the processes of oxidation. Thus, a diet that is amply sufficient for a sedentary life would not meet the requirements of an active, open-air life. Conversely, the body when called upon to undertake great muscular activity may be able to utilize a diet that in times of less activity would burden it with waste matter and lead to disturbances of health.

Albuminoids are recognized as the chief tissue-forming foods, and they are therefore needed to supply the body waste that is continually taking place to a greater or less extent. By increasing the activity of oxidation, albuminoids produce in the body increased rapidity of tissue change. In circumstances where oxidation is especially rapid, as in vigorous persons undergoing hard muscular exertion in the open air, larger supplies of food, with a greater proportion of nitrogenized elements in the diet, are required than in those who are less actively employed, or in the same persons when leading a more sedentary life. It may, however, very well be questioned whether albuminoids are ever necessary or desirable in the amounts consumed by many persons, and assuredly whenever we are brought face to face with defective elimination of nitrogenous waste, the albuminoid constituents of the dietary should be limited.

In youth, during the period of growth and building-up of the body, when muscular and nutritive activity are greatest, larger supplies of aliment, and especially of the tissue-formers, are digested and well assimilated than in later life when the period of growth has passed, and when bodily activity is not so great.

On the other hand, old people are apt to make the mistake of adhering to a diet consisting more largely of albuminoids than the diminished wants of the system in advanced age require. The result is a condition of discomfort or of distress induced by the inability of their organs to excrete the amount of nitrogenous waste matter that arises from the use of such a dietary.

The nitrogenous principles in foods, although primarily necessary for the maintenance and repair of the tissues of the body, are known to assist also in the production of force and heat. In the latter properties, however, they are secondary to the carbo-hydrates and fats.

Life is not sustained by a non-nitrogenous diet, but the carbo-hydrates and fats when combined with albuminoids are the great force and heat producers. They do not tend to increase tissue change, and any surplus of them left in the body may be stored up against future needs. Failure on the part of the system to assimilate and elaborate its supplies of the carbo-hydrates constitutes a grave defect in nutrition, notably exemplified in the case of diabetes.

The importance of fresh vegetables and fresh meats, as bearers of extractives and salines, apart from their actual nutritive value, has been fully established, but is frequently overlooked in ordinary dietaries. If proof of this were wanting, we have it in the fact that evil consequences speedily follow the withdrawal from the dietary of the important vegetable salts. Such consequences reach their climax in attacks of scurvy and allied disorders.

Concerning the condition of the digestive organs themselves, it will suffice here to mention these four essentials of vigorous digestion; namely, a healthy condition of the mucous membrane, a due supply of normal gastric juice, sufficient nervous stimulus, and good muscular tone to insure proper rhythmic movements. Each of these is important in its own place, as separate consideration of them will show; and if one or all of these conditions be impaired or absent, difficulty of digestion will result, in a more or less pronounced form, according to the extent to which the defect exists.

As regards, in the first place, the condition of the healthy gastric mucous membrane, our knowledge has been gained mainly by direct observation. Those rare instances in which it has been possible to observe, through a fistulous opening in the stomach-wall, the actual appearance of the healthy mucous membrane when it is at rest, and also the changes that occur during the process of digestion, have taught much that is of great practical importance in relation to diet, both in health and in the different degrees of disorder and disease. The well-known opportunity of this kind, that was fully taken advantage of by Dr. Beaumont some sixty years ago, occurred in the person of a healthy young Canadian, Alexis St. Martin, who was accidentally wounded by the discharge of a gun. The shot, entering the left side and perforating the stomach, carried away part of its anterior wall. The man passed

through a severe and protracted illness, but ultimately regained his health. The opening, however, never closed, and by means of it Dr. Beaumont made his valuable observations, which have since been confirmed and, in some particulars, amplified and corrected by experiments on animals.

The healthy stomach, when empty, is contracted, and its surface is pale; its vessels small and tortuous. When, however, food passes down the œsophagus, and is received into the stomach, the pink, velvety appearance of the mucous membrane is seen to give place to a brighter, slightly darker shade; the vessels dilate and become more full of blood, and the secretion of gastric juice commences. Experiments have further shown that the same results follow upon the introduction of food through an external opening, or upon stimulation by means of a smooth body introduced from without, and gently rubbed against the inner surface of the stomach. In the latter case the effect soon passes off. If, however, the stimulus be carried to such an extent as to cause irritation, effects exactly the opposite of those described above are produced; namely, contraction of the vessels, suppression of the gastric juice, and the secretion in its place of a quantity of mucus. The importance of this physiological fact will appear subsequently on many occasions.

Absorption is an important part of the process of digestion. If the stomach of a healthy animal be ligatured at the pylorus, and food be introduced by the œsophagus, it will be found that a considerable portion of the food is absorbed by the stomach. If the mucous membrane be not healthy and active, the transudation goes on very slowly, or does not take place to any appreciable extent.

Now, as regards the second condition, namely, a due supply of normal gastric juice. Proteids that have undergone coagulation are very insoluble, even under the action of strong acids; but they are readily acted upon by the gastric juice. It is necessary that the alkalinity of the food as swallowed should be neutralized, and not only neutralized, but converted into an acid state, in order that digestion in the stomach may proceed satisfactorily. It is a well-known fact that if the products of digestion be removed as they are formed, and if the acidity be kept up to the normal standard, a very large amount of food will be digested by a given, and, relatively,

very small, quantity of gastric juice. When the acidity of the gastric juice is neutralized its digestive action ceases, and in such circumstances fibrin may remain in it for a long time without being digested. If, however, the gastric juice that has been neutralized be again brought up to the standard acidity, it becomes as active as it was before. When a large quantity of fibrin is placed in a small quantity of gastric juice digestion soon ceases, but if sufficient hydrochloric acid be added, digestion speedily recommences.

Given, then, a healthy mucous membrane, a sufficiency of normal gastric juice, and an absence of any abnormal nervous interference, the comparative digestibility of food is mainly determined by mechanical conditions, which promote or retard the action of the gastric juice upon it. The greater the amount of surface that is presented to the action of the gastric juice, the more quickly will solution take place. Hence tough, doughy substances, that cling in masses, and firm, unbroken fibres, whether of animal or vegetable tissue, longer resist solution in the gastric juice than friable, minutely divided particles. It need hardly, therefore, be pointed out that thorough mastication of food is of the utmost importance, since by that means minute subdivision is secured, and consequently a vastly increased surface-area is presented for the action of the gastric juice. Moreover, in the case of carbohydrates, in addition to the mechanical effects of prolonged mastication, their digestion is begun in the mouth, by the action of the saliva converting them into dextrin.

In speaking of the appearance of the healthy gastric mucous membrane, it was implied that the stomach when empty and contracted is at rest. On the introduction of food, however, or when the stomach is stimulated in other ways, certain movements are set up. On the first entrance of food into the stomach there are but feeble indications of movement; hence it is evidently not the fact of the stomach being filled that causes the movements. If that were the cause, they would be greatest at the beginning, whereas observations show that they increase and become more marked as digestion proceeds, till they attain a rhythmic, churning action. The movements, therefore, are clearly an essential part of digestion, and are not due to any mere mechanical cause. By these regular movements fresh portions of the food are brought under the action of the gastric juice.

In health, as has been already pointed out, a dietary is suitable or well-balanced when it is properly adapted to the wants of the individual, and contains a due proportion of nitrogenous elements, of carbo-hydrates, of fats, and of salines, with water. Clinically, however, the definition does not hold good, for here the dietary must be modified according to the diathesis of the patient, the condition of his different organs, and the disease from which he is suffering. For example, when the eliminative processes are hampered, albuminoids must be cut down; and, on the other hand, when the system is unable to deal with the carbo-hydrates, they must be reduced to a minimum, and so on. Again, take, for instance, functional disorders of the digestive organs. In these cases the times of giving food and the intervals between the supplies, the amount given at a time, and the mode of preparing the food are details of almost equal importance with the consideration of the kind of food to be given. In health the regulation three meals a day are found, by the majority of people, to be the most convenient division; but the sick man cannot take a sufficient supply at a time to last for five or six hours, and consequently he must have his smaller supplies at shorter intervals. The length of the interval will depend on the quantity that can be taken at a time, the kind of food that is given, and the rapidity with which absorption is carried on.

Plain, simple cooking should be the rule in health, and much more does this apply to invalid cookery. It cannot be too good, it cannot be too simple, nor for invalids can the food be too daintily served. The surroundings and circumstances under which food is taken have a great deal to do with the comfort of the patient. The fitful, fastidious appetite of the invalid is whetted by the appearance of a little meal daintily served, while the presentation of a large quantity turns him, for the time, against all food. Sick-room cookery is now much better understood than it used to be, but it is to be feared that many nurses and attendants on the sick, not to speak of medical men, hardly yet appreciate fully the help that attention to such details will bring to those under their care.

CHAPTER II.

DISEASES OF THE STOMACH.

Chronic Gastric Catarrh (= Chronic Gastritis, Irritative Dyspepsia, Inflammatory Dyspepsia).

These are all different names given to varying degrees of a condition, or to several closely allied conditions, that frequently come before us in patients who complain that they are suffering from indigestion.

Symptoms.—On questioning such patients, they tell us that their appetite is variable and uncertain. They complain of acidity, heartburn, and pain after eating; of pyrosis; of sickness at times, coming on soon after meals, and especially after indulging in any rich or indigestible articles of diet; of thirst, and a sense of gnawing, heat, and soreness at the epigastrium; in some cases, also, there is slight epigastric tenderness on pressure. The tongue is red at the tip, furred at the base, or, in cases of long standing, it is bare, often scored and fissured. Sleep is broken and disturbed, and there is usually some loss of flesh and strength. The bowels are constipated, but constipation may, every now and again, give place to an attack of diarrhœa.

Origin and Causes.—The condition indicated by the foregoing brief outline of symptoms may have its origin in gastric congestion and catarrh, resulting from disease of liver, heart, or kidneys. It may be induced by over-indulgence in alcoholic stimulants, and it is especially common in those who are in the habit of taking spirits on an empty stomach. In persons in whom the predisposition exists, frequently recurring or continued irregularities in diet, such as eating things of known indigestibility, hurrying over meals, working close up to and immediately after a full meal, are sufficient to induce an attack. Worry and anxiety are also common causes; and we have not infrequently seen this condition, which is undoubtedly

often connected with the gouty state, alternating with outbursts of eczema.

Irritability of the Mucous Membrane.—From what has been said of the symptoms, it is evident that the condition we are here called upon to deal with is one in which there is great irritability of the mucous membrane. In these circumstances, if the food be bulky, so as to distend the stomach; if it be harsh, lumpy, and coarse, so that it irritates this tender surface; if it be highly seasoned with spices and condiments, the hyper-sensitive stomach will turn against it, the vessels will contract, the follicles will refuse their contents, mucus will be poured out; and if that be not sufficient to protect its walls and to allay the increased irritation, vomiting will ensue, and the whole contents of the stomach will speedily be rejected. Even if the stomach does not thus summarily get rid of its burden, the food will remain for a long time undigested, giving rise to flatulence, weight at the epigastrium, and a sense of fatigue and depression in place of strength and refreshment will ensue.

Small Quantities of Food at Short Intervals.—In such circumstances as these, food must be given in very bland, easily digestible forms, in smaller quantities at a time than in health, and at shorter intervals of time. Moreover, the food must be partaken of very slowly. If the symptoms be severe, the rules will be the same as for a case of gastric ulcer or gastric erosion (see p. 554), but in less severe cases the following dietary will be suitable:

Dietary.—In all but comparatively slight cases it will be better for the patient, at first at least, to have his breakfast in bed, as he is sure to feel somewhat tired after the exertion of dressing. If he is sufficiently well to be up and about, let him take before rising a teacupful of milk, with enough hot water in it to take the chill off, and let breakfast follow very shortly after he is dressed. It may be here repeated that strict injunctions must be given the patient to take all food very slowly by teaspoonfuls, and at a temperature rather cool than hot, but not actually cold. A typical breakfast will consist of a breakfast-cupful of "tops and bottoms," or unsweetened rusks, made as for infants' food, or a cupful of any prepared farinaceous food.

Some patients can go on taking the same things with relish

for a considerable time, while others very soon get tired of one thing, and require a change. As much variety as possible should be introduced into the dietary, and, in addition to the alternatives already given, another change may be made by substituting, for plain milk, weak cocoa nibs or peptonized cocoa, made with boiling water, with some milk added in the cup.

10:30–11.—A small glass of milk with the chill taken off, and a teaspoonful of malt extract added to it, or a teacupful of chicken-tea with a plain biscuit or thickened with some farinaceous material.

1 o'clock.—A breakfast-cupful of good beef-tea ("whole beef-tea," *i.e.*, with some of the meat dried, pounded, and mixed with the liquid) or a breakfast-cupful of strong mutton-broth, with a finger of toast dipped in it.

4 o'clock.—A cupful of milk flavored with tea, or a cupful of cocoa nibs with a slice of thin bread and butter.

6:30–7.—A meal like that at one o'clock; some variety of broth or beef-tea.

9:30–10.—A teacupful of water arrowroot with a dessert- or a tablespoonful of brandy stirred into it, or a cupful of Mellin's food.

Food at Night.—If the patient sleeps well throughout the night, there is no necessity for him to have food; but if he wakes up, a glass of milk and water, or gruel, or farinaceous food made thin, and kept in a covered jug under a cosey, should be within reach; or some meat-jelly, and a few spoonfuls of the jelly, or a teacupful of the other food, will often help to procure sleep.

Alcohol.—It will be observed that the only admission of alcohol into this dietary is the small quantity permitted at bedtime, and, as a rule, these patients are better without more. Some, however, either from age or from feebleness of constitution, are so weak that it is necessary to allow a small amount during the day as well, and it will usually then be found best to give it in the form of old spirit, in quantities varying from a teaspoonful to a tablespoonful, either in the food at the midday and evening meals or in a claret-glassful of water, sipped just after the food.

Treatment of Severe Cases.—Severe cases of the kind now under consideration will at first require the same treatment

as cases of acute gastric catarrh, or of gastric ulcer, and there will be found many gradations between such cases and the slight ones. It will frequently be necessary to begin treatment on the strictest plan, and, as the condition of the stomach improves, to advance gradually to a dietary similar to the one just given.

Food in the Convalescent Stages.—As convalescence progresses, a further step will then be to substitute plain purées (see Chapter XXI.) of chicken or game, or panada of chicken, or boiled sole, or whiting, for the liquid at the midday and evening meals. Next, a lightly boiled egg, or a poached egg, with dry toast or stale bread and a little butter, and a cup of cocoa, may be given at breakfast. If that be well borne, go on to boiled white fish of the lighter kinds at breakfast, continuing the pounded meat for dinner.

Gradual Return to Ordinary Diet.—By degrees, allow the patient to return to ordinary but very simple food in the solid form. A slice of roast mutton, or the thick part of a mutton-chop, or the breast of a chicken, with bread, some well-boiled spinach, or other tender green vegetable, will come in first at the midday meal—giving boiled sole or whiting at the evening meal. It should be kept in mind that no cases are more liable to relapse than these, and that upon what may seem a very trifling irregularity of diet. The process of change, therefore, must be gradual, and it is well not to run the risk of a relapse for the sake of getting back to ordinary food a little sooner. If such patients are to keep well they must, for a considerable time at least, and sometimes altogether, abstain from eating salted and cured meats, preserved or tinned fish, pastry, "made-dishes," raw vegetables, cheese, nuts, sweets, and especially from any form of stimulant upon an empty stomach.

Constipation.—Constipation is often troublesome, especially in earlier stages of treatment, and the irritability of the mucous membrane of the digestive tract prevents its being obviated by the use of brown bread, fruit, and vegetables. Some simple aperient or an occasional enema will be required, but these should not be too soon resorted to nor too often repeated, lest the habit of depending upon artificial means become established.

Atonic Conditions of Stomach: Atonic Dyspepsia.

Symptoms.—Forming a marked contrast to the foregoing cases in many ways, yet not far removed from them, and in some features presenting a family resemblance, are those patients who come before us complaining of a sense of weight and fulness in the epigastrium, with distention coming on a short time after eating. Occasionally there is slight pain, sometimes spasms, but as a rule discomfort and a sense of sinking are complained of, rather than any acute pain, and there is no tenderness on pressure—in fact, moderate pressure, for the time being, affords relief. Acidity, pyrosis, and vomiting are usually absent, but there is a good deal of flatulence, and discomfort is temporarily relieved by eructations. The flatulent distention usually extends to the bowels as well, and gives rise to colicky pains in the region of the hepatic or splenic flexure of the colon. These patients are depressed, inclined to take gloomy views of life and of their own affairs; often irritable and wanting in resolution, and, as a rule, they sleep badly. The pulse is feeble, soft, and compressible. The tongue is large, flabby, and pale, slightly coated or clean, and usually indented at the edges by the teeth.

General Want of Tone.—This condition of affairs, indicative of general as well as local want of tone, comes on for the most part gradually. It may follow upon some form of gastritis; it may be brought on more rapidly by some great and sudden change in the habits, as from an active, open-air life to a sedentary one, or it may be hereditary. No one who has give attention to digestive disorders can fail to have been struck by the frequency with which feebleness of digestion is handed down from parent to child, not necessarily in the same form, but often in a greater degree. While in private practice we find that this atonic dyspepsia comes on gradually in those who persistently disregard the ordinary laws of health, by neglect of proper exercise, by hurrying over meals, and by eating and drinking more than their bodily expenditure warrants—in hospital practice, on the other hand, the most common causes are found to be deficiency of proper food and an undue indulgence in tea.

Appearance of Stomach.—The appearances of the stomach are quite different from those in cases where irritability is the

chief symptom. The stomach looks flabby and relaxed; the surface is paler than usual, smoother, more moist, and covered with a layer of mucus.

In the class of cases now under consideration the regulation of diet, as a means of cure, plays a not less important part than in those where, owing to the very sensitive condition of the mucous membrane, its effects are at once more strikingly apparent. Moreover, since this atonic state of the stomach is associated with flabbiness and want of tone of the system, the general condition has to be improved by exercise and by every means that will help to brace up the patient.

Not so much depends upon the kind of food that is taken, provided it is simple, as upon the way in which meals are arranged and the circumstances under which the patient takes his food. If he eats hurriedly, and especially if he sits down to meals hot and exhausted, the inevitable discomfort follows. An alteration and adaptation to circumstances of the food and hours of eating will in many cases effect a cure without much change in the diet itself.

Morbid Ideas and Introspection.—A considerable number of these patients are very much inclined to dwell upon their own feelings and symptoms, and to think too much about what food seems to agree with them and what does not. It is better that they should not take their meals alone, and it is of great consequence that their minds should be occupied with some healthy interest which will prevent them from turning in upon themselves.

Bathing and Exercise.—The first direction to them will be to have a morning bath, tepid or cold, according to the age of the patient, the state of his circulation, and the season of the year. The rubbing which follows, and if necessary to produce a good reaction also precedes, the bath is not the least important part. These patients should not attempt to do much before breakfast, though there is no harm in their being in the open air for a short time before the morning meal. Any hard exercise, however, such as tennis or a long walk at that time, will only exhaust and depress. If exercise is to be taken in the morning, it should be preceded by a light early breakfast, say a cup of cocoa and a slice of bread and butter, or a glass of milk and a biscuit. Many patients, especially the more delicate ones, with small reserve stores to

draw upon, find that they cannot take early morning exercise without feeling tired, drowsy, headachy, and, as they often express it, "good for nothing" all the day. The reason is that they go for too long a time without food. They have had nothing to eat for some twelve or fourteen hours, and they are surprised that if they take active exercise before breakfast they are exhausted for the rest of the day. Let such people try the plan of taking a light early breakfast, after which they will enjoy and benefit by a morning walk, a ride, or a game of lawn-tennis. Here let it be remarked that one of the best, if not the very best, exercise for the "atonic" is a morning ride; it promotes the activity of the liver and obviates the tendency to constipation. If the patient is not accustomed to this exercise, it should be commenced gently, and gradually extended from an hour to an hour and a half, or two hours if time permits; being preceded, of course, by a small, light meal as already indicated, and followed by the bath and breakfast.

Dietary.—Passing on to the details of the diet, the rules should be, simple food, plainly cooked, no large meals, and consequently no long intervals between the meals.

Breakfast. — Boiled sole, whiting, or flounder; or a slice of fat fried bacon, or a lightly boiled egg. A slice of dry toast with a little butter, or of brown bread (not new) and butter.

Beverage.—One cup of cocoa, or of milk and water, sipped after eating.

Luncheon.—Chicken or game, with bread, and a little tender, well-boiled vegetable, such as spinach, vegetable marrow, or young French beans.

Beverage.—Half a tumblerful of water, sipped after eating.

Afternoon Tea.—A cup of cocoa, or of weak tea with milk, and a slice of brown bread and butter.

Dinner.—(Two courses only.)

Fish of the kinds allowed for breakfast, with melted butter.

A plain *entrée*, or game, with a little mashed potato or potato chips.

For sweets and dessert, a plain biscuit will suffice; or,

A slice of any tender meat, such as saddle or loin of mutton, or the thick part of an underdone chop; a little mashed or grated potato.

A spoonful or two of any plain milk-pudding, to which may be added some stewed fruit.

Beverage.—Half a tumberful of water, with from one to two tablespoonfuls of spirit.

It will be observed that the quantity of fluid entering into the above diet is very limited, and this restriction in liquids must be impressed upon the patient as an important element in the dietary. The reason for this is apparent when we recollect what the condition of the mucous membrane is, and how that condition interferes with rapid absorption. If a quantity of fluid be taken at meals—for example, soup, or even plain water—digestion is much delayed, fermentative changes take place, and the results are flatulence and discomfort. If, however, these rules regarding liquids be made too strict, the tendency to constipation is favored, the evacuations becoming scanty and difficult. This may be overcome by giving half a pint of hot water to be sipped at bedtime, and a like quantity of cold water the first thing in the morning. If these means do not suffice to obviate the constipation, and the dietary already contains a fair allowance of brown bread, fresh vegetables, and stewed fruit, massage to the abdomen should be regularly carried out. Failing all other means, a dinner-pill containing aloes, rhubarb, or cascara with aromatics must be given.

Alcohol should be very much restricted, or not given at all. If used, the best form is old spirit (℥ ss.– ℥ i.) in a little water, sipped after food, or in the hot water at night.

Ulcer of the Stomach.

While it is true that the symptoms of ulcer of the stomach vary greatly in intensity and urgency, the slighter cases, equally with the more severe ones, demand careful dietetic treatment.

Rapidly Fatal Cases.—Cases that commence in an insidious way, with obscure symptoms, often go on rapidly to perforation and a fatal termination. It is difficult to say whether in the very speedily fatal cases any treatment could avail to stop the necrotic process and avert a fatal issue; but in other cases we have the satisfaction of knowing that much may be done by regulation of the diet, not only to prevent suffering, but in many instances to effect a cure.

Rest Most Important.—Rest is the chief part of the treatment generally adopted in dealing with an ulcer in any other situation, and the same principle applies to the stomach no less than to other parts of the body. Not only must the patient be kept quiet, and warned against fatigue, over-exertion, and strain, but in severe cases absolute rest in bed must be enjoined, at least until the urgent symptoms have subsided.

Physiological Rest.—Without such precautions physiological rest for the stomach will be of little avail. The two forms of rest must be united if the treatment is to be successful. Moreover, the patient's supplies of nourishment being somewhat limited, the saving of strength obtained by rest in bed is often very important, and by keeping the stomach itself at rest, as far as that is practicable and possible, the best chance is afforded for the healing of the ulcer. It is not always necessary, indeed it may not always be desirable, to forbid all food by the mouth; but it must be remembered that the introduction of any food, even the blandest, excites the circulation in the stomach and produces an increased supply of blood, thus tending to irritation of the ulcer, besides stimulating the secretion of gastric juice.

Causes of Pain.—The acid gastric juice, too, coming in contact with the tender surface of the ulcer, causes pain, and often sets up vomiting, which of all things is most to be avoided. Pain is also kept up and increased by anything that increases the peristaltic movements of the stomach; hence the coarser the food and the greater the quantity, the more the movement and the greater the pain, which in such circumstances usually lasts until the offending mass is rejected.

Coarse and Bulky Food to be Avoided.—All rough and bulky food must therefore be forbidden, and the patient must be restricted both in the kind of food that he takes and in the quantity taken at a time. The food must be of the mildest kind—pulp and pap, or fluid given in small amounts at short intervals, and the smaller the quantity that can be borne at a time the shorter must necessarily be the intervals between the supplies.

Necessity for Food being taken very Slowly and in Small Quantities: Alkalies.—Another important point is the way in which food is taken. The sensitive stomach is much better able to retain food with comfort if it be taken very slowly

than if it be hurriedly gulped down. In writing out directions for such cases it is best to insist upon all food being taken by teaspoonfuls, and that, for example, instead of attempting to take a draught of even simple cold water, it should be slowly sipped, or small pieces of ice should be sucked. When there is no dislike to milk, it should form a main part of the dietary, as milk and soda-water, or peptonized milk, or in the form of bread or rusks and milk. Where acidity is troublesome, lime-water, prepared chalk, or magnesia is a good counteractive, and, when added to the milk, prevents its curdling into hard masses, which so often set up vomiting. Beef-tea or broth thickened with some farinaceous substance, such as powdered biscuits, baked flour, or a prepared farinaceous food, may be given two or three times a day. Malt extracts are very valuable additions to the dietary, and can be used either alone or in milk. Sometimes skimmed milk, though, of course, not so nutritious, or even buttermilk, agrees best.

Nutrient Enemata.—When, however, a sufficiency of nourishment, even with the greatest economy of bodily waste, cannot be taken by the mouth in the way indicated above, without too greatly curtailing the periods of rest, nutrient enemata must be resorted to in addition. In the severe forms, where the symptoms are urgent—for example, during the occurrence of hæmatemesis—all food by the mouth must be stopped and reliance placed for the support of life upon nutrient enemata alone. With due precautions as to warmth and rest, not only may life be sustained in this way, but even the weight of the body maintained for a considerable time. Treatment is rendered much more difficult in those cases where nutrient enemata are not well borne; but seeing the importance there is for keeping up the patient's strength, they should not lightly be given up, and every means should be tried to secure their toleration. In some extreme cases inunction with oils has been found useful in tiding over an anxious time and aiding other means of support.

Small Doses of Sedative before Food.—In connection with the dietetic treatment of gastric ulcer, it should mentioned that not infrequently, where great irritability of the stomach exists and there is difficulty in getting food retained, a very few minims of laudanum or of liquor morphiæ in a teaspoonful of water, given shortly before the food, prevents vomiting.

As has already been remarked, vomiting is of all things most to be avoided. It tries the patient sorely and greatly interferes with the healing of the ulcer.

Treatment of Constipation.—The constipation that is so commonly present in cases of gastric ulcer cannot be treated dietetically, and is best met by simple enemata.

Importance of an Accurate Record.—It is necessary in most cases of this kind to be precise in giving directions to the nurse in charge of the patient, and the physician will do well to have an accurate record kept of the measured amounts of food given and the exact times at which they are taken. By this means the total quantity taken in twenty-four hours can be at once seen, and the intervals can likewise be noted.

Dietary in a Severe Case: Nutrient Enemata.—In a severe case the quantity of liquid food given at one time to be sipped by the patient should not exceed from two to three ounces, and the intervals should not be greater than two hours. In this way about two pints of fluid will be taken in the day, and if it be mainly milk with some farinaceous material, such as baked flour, arrowroot, powdered biscuits, or a prepared food like Mellin's or Allen and Hanbury's, it conveys a fair quantity of nutriment, and may be for the time sufficient without nutrient enemata. If, however, the milk, before it will agree with the patient, has to be much diluted with soda-water or lime-water, the nutritive value being thereby so much reduced, nutrient enemata should be given twice in the day, say morning and evening.

Predigested Foods, per Enema.—The best forms of nourishment to be given in this way are prepared and predigested substances, such as peptonized milk, peptonized gruel, beef peptones, malt extracts, and prepared farinaceous foods, with, if necessary, from two teaspoonfuls to one tablespoonful of brandy. It is hardly necessary to point out that, in order to be well retained, the enema must be small in bulk, the temperature lukewarm, and that it must pass gently and slowly into the bowel. A heaped tablespoonful of a prepared malted food, with a little milk and enough hot water to sufficiently raise the temperature, and to make the whole quantity up to one and a half ounces; or two teaspoonfuls of beef peptonoids in two or three tablespoonfuls of warm water, are typical examples.

Addition of Opium to Enemata.—If less than from two to three ounces, perhaps only a couple of tablespoonfuls, taken by the mouth, can be borne at a time without causing pain and sickness, then the amount that can be tolerated, even if only from one to two tablespoonfuls, should be given every hour. Three or four nutrient enemata should be given in the day to supplement. Sometimes tenderness and irritation of the rectum and anus prove troublesome, and render this treatment difficult, but usually fifteen drops of laudanum added to the enema, or an occasional opium suppository, removes the difficulty.

Dietary.—In less severe cases, and, in the absence of urgent symptoms, also during the convalescent stages of the more severe cases, it will suffice to restrict the patient to the blandest articles of diet, food being given in four small meals, with two little intermediate supplies, thus:

Breakfast, 8 A.M.—A breakfast-cupful of bread and milk, or of rusks and milk, or a cupful of cocoa made with milk, with toast thoroughly soaked in it.

10:30.—A good teacupful of beef-tea or of broth, thickened with some farinaceous material.

1 o'clock.—A cupful of plain *purée*, or later on, in convalescence, a piece of boiled sole, with the inside of a slice of bread, neither new nor stale.

4 o'clock.—A cup of milk or of peptonized cocoa.

6 o'clock.—A meal like the midday one.

9 o'clock.—A cupful of milk thickened, or of Mellin's food.

Note.—All the food to be taken very slowly, and neither hot nor cold.

A teaspoonful of malt extract added to the milk twice daily is most useful.

During the night, if awake, the patient should have handy by his bedside some diluted milk or peptonized gruel, in a covered jug kept warm under a cosey, and of that a cupful may be sipped.

Gradual Enlargement of Diet.—Gradually, as convalescence goes on and the patient gets about a little, the dietary may be enlarged by the addition of sago, tapioca, or macaroni puddings, custards, eggs beaten up in milk or very lightly boiled, white fish boiled, panada of chicken, and good broth; but still the rule should be a small quantity at a time, and

nothing hard, bulky, or difficult of digestion for a considerable time after all symptoms have subsided.

Danger of Relapse.—When relapses occur, as they not infrequently do, they are almost always traceable to errors in diet. It is important to remember that in gastric ulcer the powers of digestion are but slowly regained, and haste in returning to ordinary diet is almost sure to retard convalescence.

We have post-mortem evidence in abundance to show that fresh mischief has often been lighted up either at the site of the original ulcer or in its immediate neighborhood, and followed by fatal hemorrhage, simply by errors in diet.

Cancer of the Stomach.

Much that has been said in relation to diet in cases of gastric ulcer applies equally to cancer of the stomach, but in some important points, which have a bearing upon dietetic treatment, the two diseases present different symptoms.

Dilatation of Stomach in Cancer.—Dilatation of the stomach, for example, although occurring in a certain proportion of cases of ulcer from thickening and contraction at the pylorus, is much more common in cancer, owing to the frequency with which the growth causes pyloric stricture. Again, until the pyloric obstruction becomes marked, there is often less acidity present than in ulcer.

Character of Pain.—Pain, likewise, is more constant and continuous in cancer, and it does not bear the same relation to the taking of food as it does in gastric ulcer, being often present when the stomach is empty. It is more of a dull, aching character than in ulcer, but the taking of food may bring on an exacerbation often referred to the back, and resembling a paroxysm of neuralgia.

Loss of Appetite.—What with the loss of appetite, that is so constant a symptom, and the fear of increasing the pain, patients are often afraid to take much food. Others, again, find little difficulty so long as the food is simple and more or less fluid. In these cases, however, violent attacks of pain, lasting sometimes for hours, may occur at night quite independently of the taking of food.

Loss of appetite is usually a marked and early symptom

in cancer, but exceptional cases occur when the cardiac orifice is involved, where the trouble is not so much disinclination for food as difficulty in swallowing. Up to a certain point in such cases there may not only not be much loss of appetite, but hunger may be distressing. The food does not reach the stomach, and speedily regurgitates unaltered. Rapid loss of flesh and strength are the result, unless the patient be supported by predigested nutrient enemata, as the only food that can pass into the stomach is a very small quantity of liquid at a time.

Widespread Degeneration of Stomach.—Another important point in regard to cancer of the stomach is, that the tissues of that organ, beyond the limits of the growth, are involved in widespread degenerative changes; hence secretion and absorption are very seriously interfered with, and nutrition thereby so much the more hampered. Progressive, usually rapid emaciation is a characteristic of the disease, which no dieting can counteract; but the patient may be helped and made more comfortable by the use of nutrient prepared enemata, and the extensive disorganization of the stomach, already referred to, is an indication for the use of prepared foods and peptonized milk, etc., which will pass through the stomach easily, and be acted upon lower down the intestinal canal. This method of feeding in these cases often gives great relief to the urgent symptoms.

Diet Similar to that in Gastric Ulcer.—For details of diet the reader is referred to p. 554, where, under the heading of Ulcer of the Stomach, the particulars are given. The order of things must, however, be reversed in so far that the diet recommended in the later or convalescent period of ulcer is the one suitable to the earliest periods of a case of carcinoma; and since cancer always runs an unfavorable course, the directions which apply to cases of severe ulceration (p. 557) are those to be followed in the later stages of cancer. These are, in brief, liquids in small quantities, at frequent intervals, the length of which will be determined by the amount that can be well borne at one time, and predigested nutrient enemata, given in the manner stated on p. 557.

Hæmatemesis.

It is not necessary to give in detail a diet for cases of hæmatemesis, since in the great majority of cases serious hemorrhage from the stomach is due to either ulcer or cancer of that organ, and in speaking of these affections (pp. 554, 559) the diet during the continuance of hæmatemesis has been mentioned. It is sufficient to repeat here that during the occurrence of hemorrhage, and more particularly if it should persist, all food by the mouth should be stopped, and reliance placed upon nutrient prepared enemata to support the patient's strength.

Inflammation of the Stomach (Acute and Subacute Gastritis: Acute Gastric Catarrh).

The heading of this section will of itself indicate the somewhat wide range of conditions that are intended to be included in it. It seems best to group these together, considering them, for our present purpose, as different degrees of the inflammatory process rather than as different affections.

Pathology.—The post-mortem appearances found in the stomach are often indefinite and misleading, since no organ is more prone to undergo softening and other changes after death. Hence these morbid appearances are not all to be accepted as evidence of pre-existing gastritis. On this account the observations of Dr. Beaumont on the living subject in the person of the Canadian, St. Martin, are most valuable as evidences of at least the early inflammatory changes taking place in the gastric mucous membrane. The earliest noticeable alterations were reddening of the mucous membrane, which appeared irregularly congested, with diminished secretion of gastric juice and the presence of a large quantity of viscid mucus. This state of matters increased; the patches, besides being more numerous, were larger, and some of them became aphthous; thick, ropy mucus and a muco-purulent fluid tinged with blood took the place of the natural secretions. In the instance of St. Martin these appearances gradually subsided under the influence of proper diet and medicine; but where such a favorable result does not take place, we can readily

imagine that they are the percursors of more serious lesions, namely, hemorrhages, superficial abrasions, and ulcerations.

Gastritis from Irritants.—Cases of poisoning by corrosives and irritants, where the quantity taken and the intensity of the inflammation are not sufficient rapidly to destroy life, are naturally included in this group, as in their after-treatment they require dieting similar to that suitable for other forms of gastritis. It is likewise manifest that there will be considerable variety in the intensity of the symptoms in different cases falling under the above headings.

Considering the complex structure of the stomach, its functional activity, and the manner in which it is frequently treated by its owner, acute gastritis, apart from the effect of direct irritants, is not of so common occurrence as we might expect.

Predisposition.—Individual predisposition, either inherited or acquired, is often to be traced, and in such persons inflammatory gastric attacks may be set up by causes that in others would have no effect. Repeated attacks undoubtedly render the subject of them more and more liable to a recurrence of the disorder from slight causes, and any acute fever or debilitating illness is likewise a predisposing cause—probably partly because both the quantity and the quality of the gastric juice are then deficient. If in such conditions of general weakness care be not exercised as to the quantity and kind of the food taken, the gastric juice not having sufficient activity, fermentation and decomposition of food will result, and gastric catarrh will ensue. Thus, too large a quantity of even digestible food may on this account act in the same manner as a less amount of indigestible food does. Food, also, that in itself is not indigestible, may become so when imperfectly masticated, in which condition it is practically impervious to the action of the gastric juice.

Effects of Alcohol: Chronic Diseases: Chill.—Undiluted alcohol, a large quantity of condiments and spices, food that has already begun to decompose before it is taken, and substances that retard digestion, such as narcotics, may each and all be the exciting cause of acute gastritis or gastric catarrh. Again, in the later stages of some chronic diseases —for example, in heart disease and cirrhosis of liver, where a backtide of blood keeps up congestion of the stomach—gas-

tritis may be readily induced. A sudden chill in those who are predisposed to the disorder may of itself bring on an attack. Over-care in regard to food is considered by some to be a predisposing cause; but may we not rather believe that in these persons there is an inherent weakness of stomach, that experience prompts the carefulness, and that in reality delicacy is the cause of the susceptibility to acute gastric troubles?

Sthenic and Asthenic Cases.—Coming now to the question of treatment, we may, for practical purposes, divide the patients into two classes—(1) the robust or plethoric individuals, in whom the acute gastric disorder is the result of some irregularity in eating and drinking; (2) those who are weakly and in feeble health, perhaps the subjects of some one of the chronic diseases already alluded to. In the latter, acute or prolonged gastric disturbances are a serious complication.

Fasting.—In the sthenic class abstinence is the first thing to be enforced, both as regards food and drink. Rest is what the stomach needs to regain its normal condition. Even the mildest forms of food cause a certain amount of hyperæmia in the stomach, and so tend to keep up the catarrhal condition. It is, therefore, best to advise the patient to fast for, say, twenty-four hours, more or less, according to circumstances, giving only small pieces of ice to be sucked or sips of iced water. Following upon this will come milk diluted with lime-water or with soda-water, in small quantities at short intervals.

Nutrient Enemata.—If there be any cause for uneasiness as regards keeping up the strength of the patient, owing to the fever that may be present, or the persistency of the attack, then nutrient prepared enemata should be given in place of risking more food by the mouth. The question of nutrient enemata is more fully entered into in the section on gastric ulcer (p. 557), to which the reader is referred for details.

Prepared and Predigested Foods.—The same indications for the use of prepared foods hold good as strongly in cases of gastritis as in gastric ulcer, and their use should be continued for some time, until the powers of digestion return more fully. The addition of brandy to the enemata, or not, will depend upon the symptoms in each individual case, but very frequently from ten to fifteen drops of laudanum are useful in allaying irritability, and securing the retention of the enema.

The prominent point in the treatment, that of giving rest to the stomach, must not be lost sight of; and in proportion as danger to the patient from asthenia becomes apparent, so sustaining measures are called for, and these will consist for the most part of nutrient enemata of the kinds already specified.

Vomiting.—When vomiting is continued and severe, causing great exhaustion, it may sometimes be checked by giving, at frequent intervals, a few drops of brandy in a teaspoonful of iced water, or small quantities of champagne also iced. In other cases nothing but sedatives, of which the best is morphia, given hypodermically, are of any avail in allaying sickness.

Care in Diet during Convalescence.—During convalescence the greatest caution is necessary in allowing the patient to return to ordinary diet. When fermentation with acidity is troublesome, and cannot be controlled by giving the sulpho-carbolate of soda or glycerin of carbolic acid, it is well to limit the amount of farinaceous substances in the diet, and to give broths, good beef-tea, panadas, jellies, etc., in addition to milk with alkalies. Where acidity is not so troublesome, farinaceous materials may be given more freely, and may, indeed, often form the staple of the diet. For further details of quantities see diet (p. 558) for convalescence from gastric ulcer.

CHAPTER III.

DISEASES OF THE INTESTINAL TRACT.

Constipation.

While, undoubtedly, the recognized rule that the bowels should be evacuated once every day ordinarily holds good, there are certainly not a few persons found whose bowels act only once in two or three days, or even at much longer intervals, and whose health nevertheless is perfectly good.

Habit.—It is well to bear this habit or idiosyncrasy in mind when such cases come before us, because where it has become fixed we shall do them little good, and perhaps make them very uncomfortable, by treatment directed toward altering the habit. Even if we succeed in establishing for a time more frequent defecation, reaction will sooner or later follow, and the bowels will relapse into a state more sluggish than before our interference.

Effects of Diet.—Different habits of diet have a distinct bearing upon the fulness and frequency of the evacuations, and any change in diet that may have occurred should be taken into account in dealing with a particular case. In those who are small eaters, and whose food consists mainly of such articles of diet as are concentrated and leave but little residue, there is, of course, very little waste material to be thrown out by the bowels; hence constipation is apt to be induced. The indication clearly is to put the patient on a diet more bulky and less nutritious; but in the case of these patients care must be exercised to prevent such an alteration of diet disordering their digestion, especially at first, and the change should be gradually effected.

Oily Matters.—In cases where the fæces are lumpy and the mucous membrane dry, an addition to the diet of some oleaginous materials will of itself often suffice to put matters right. Cream, butter, salad-oil, etc., may be given with advantage.

Neglect and Irregularity.—Where through carelessness and hurry the habit of regular defecation has been neglected, the necessity of persistent regularity in this important matter must be impressed upon the patient, for without it all our care in arranging a diet will probably be thrown away. In young people this is a frequent cause of constipation. In girls and women, in addition to neglect in this respect, other factors often enter into the causation; for example, the movements of the intestines are often hampered by want of freedom in dress and by insufficient exercise.

Sedentary Habits.—Sedentary habits undoubtedly conduce to inactivity of the bowels, and may lead to chronic constipation where the tendency already exists. A variety of exercise is requisite, and exercise that involves increased action of the abdominal muscles, such as riding, is much more efficacious than merely walking. On the other hand, an undue amount of exercise may induce temporary constipation, and excessive perspiration sometimes has the same effect; but these conditions right themselves, as a rule, without requiring special dietetic or medicinal treatment.

Catarrh.—Chronic intestinal catarrh and other conditions, followed by impaired muscular tone in the intestinal walls, must be recognized as causes of chronic constipation. Loss of general muscular power, and, in women, relaxed conditions of the abdomen following pregnancy, must also be taken into account. In many of these cases systematic massage of the abdomen is invaluable, when conjoined with dietetic means, in relieving constipation and in bringing about a more active state of the bowels. Under its use the tone of the intestinal muscular coat and of the abdominal muscles is greatly improved, the secretions are increased, and regularity of action is gradually established.

Care in Changing the Diet.—In regard to dietetic means in general, it may be said, again, care must be exercised in arranging a diet so as not to disorder the digestive organs. Although a certain proportion of innutritious material in the diet is desirable if the patient has been accustomed to take concentrated food, leaving little residue, it will not do to change suddenly to a bulky dietary. The introduction of fruit, green vegetables, porridge, brown bread, etc., must be made by degrees, so that the digestive organs may get accus-

tomed to the change. At the same time, regular and sufficient attention to the calls of nature must be inculcated as being a means of the utmost importance. Articles of diet that disagree and disturb digestion should not be persevered with at first, although perhaps later on they may be gradually introduced and may come to be taken with advantage. In the early stages of treatment it may be necessary also to use some aperient; for example, cascara sagrada, in small and gradually diminishing doses to aid the diet.

Fruit.—For some people raw ripe fruits do excellently, and can be taken early in the morning or at any time on an empty stomach, which adds to their efficacy; but with others they disagree, and where dyspepsia is a prominent symptom they are contra-indicated. These persons, however, can often digest cooked fruits, especially when prepared with an alkali, as thus the acidity is done away with. Among preserved fruits, stewed prunes and figs may be mentioned as decidedly laxative, and so also are raisins. Coffee and cocoa favor the action of the bowels more than tea, and some people find help from a glass of bitter ale or of cider. Many men regard a pipe or even a cigarette after breakfast as conducive to regularity in the action of the bowels, but probably this is at least partly accounted for by the fact that in such circumstances the morning duties are not hurried over, and the bowels get a better chance of being fully relieved.

Hot or Cold Water.—A simple and frequently efficacious aid to regularity of the bowels is to sip slowly a half-pint of cold or of hot water early in the morning. If that does not suffice, the addition of a like quantity taken in the same way before going to bed at night will often produce the desired effects.

In sketching out the details of diet more exactly, we may divide these patients into two classes; namely, those in whom dyspepsia is not a prominent symptom, and those in whom it is markedly present.

Dietary in Simple Constipation.—For simple constipation without dyspepsia the following will be suitable:

Early in the morning some ripe fruit, such as an orange or an apple.

Breakfast.—Well-boiled oatmeal porridge and milk, fresh fish or fat bacon, brown bread and butter, coffee with milk.

Luncheon.—A slice of cold meat, bread, salad (dressed with oil). Ripe or cooked fruits.

Dinner.—Soup or fish; any variety of tender meat, well-boiled green vegetables, and a little potato mashed with cream. Fig-pudding, apple charlotte, or plain stewed fruit with cream. A biscuit and butter. Dessert.—Ripe fruit, French plums, or dried figs. A cup of black coffee, without sugar.

Before going to bed, a glass of plain or of aërated water.

Exercise.—A sufficiency of exercise varied in form—walking exercise only often does not answer—should be enjoined in these cases; and if for any reason this cannot be taken, massage of the abdomen should be practised.

Dietary in Constipation Complicated by Dyspepsia.—In the second class of cases, where dyspepsia complicates matters, we have to be very careful not to aggravate this by alterations and enlargements of the ordinary dietary. The early morning fruit sometimes disagrees, raw vegetables are difficult of digestion, and brown bread irritates the sensitive mucous membrane.

A glass of water sipped the first thing in the morning, if taken slowly, will probably cause no discomfort, especially if it be hot instead of cold. If oatmeal is found difficult of digestion, porridge made of whole wheat-meal may be substituted, and coarse brown bread had better be avoided. Salads and cabbage frequently cause flatulence in these patients, and so defeat the objects in view; but young spinach, tender Brussels sprouts, and cauliflower can be taken with impunity.

It is obvious that in dealing with this class of cases we must feel our way gradually, until we learn what the digestive organs in the particular instance before us can accomplish, and we must regulate the diet accordingly. It is safer, and likely to lead to a more speedy cure in the long run, if we begin cautiously, and do not proceed more rapidly than the digestive powers can bear.

Such a dietary would be in detail as follows:

7:30 A.M.—A half-pint of water sipped very slowly.

Breakfast, 8:30.—A small plate of porridge with a little cream or new milk.

9 o'clock.—Some bread, not new, and butter; a small cup of coffee. A few strawberries, grapes, or other ripe fruits in their season.

Or 9 o'clock.—If porridge is not taken, a slice of fat bacon or of ham, or a piece of fresh fish, or chicken, or game, should be taken along with the bread and butter and coffee, followed by fruit.

1 o'clock, luncheon.—A slice of any tender meat with bread, and a little well-boiled green vegetable. Beverage, a glass of water.

If meat is taken at breakfast, luncheon may consist of shape or pudding and stewed fruit, with bread or biscuit and butter, followed by ripe fruit.

Tea, 4:30.—A cup of weak tea with milk, and a slice of thin bread and butter, or a cup of cocoa.

7–7:30, dinner (two courses).—Fish or meat and a plain pudding. Beverage, a glass of water.

In the foregoing dietaries, alcohol has not been included, as it cannot be considered a necessary addition, although in a certain proportion of cases a glass of wine at luncheon and at dinner undoubtedly seems to favor regular action of the bowels.

Mellin's Food or Cream.—For invalids troubled with constipation, a breakfast-cupful of Mellin's food is often a sufficient laxative.

In young children a teaspoonful of cream added to one or two of their supplies of milk, or a teacupful of chicken- or mutton-broth, will often obviate a tendency to constipation. Mellin's food in barley-water or dissolved in the broth is likewise a most useful addition in these cases.

Diarrhœa.

In all cases of continued relaxation of the bowels, treatment by diet occupies an important place, and the dieting of the patient is one of the first questions claiming attention. In fact, where diarrhœa is dependent on local causes, regulation of the diet alone will usually suffice to effect a cure, in the absence, of course, of actual organic lesions.

For the present purpose it is not necessary to enter into a detailed classification of the different forms of diarrhœa and their causes, but one or two distinctions should be emphasized.

Diarrhœa of Bright's Disease, etc.—It need hardly be remarked that diarrhœas dependent upon and occurring during

the progress of such maladies as chronic Bright's disease, cirrhosis of the liver, tuberculosis, etc., must be looked upon as part of the disease, not as a separate condition, although palliative treatment may be required. These forms of diarrhœa hardly come under consideration by themselves, though some modification of diet, based upon the general principles of treatment of diarrhœa, may be desirable.

Nervous Diarrhœa.—Another form of diarrhœa is that set up by causes acting through the nervous system. Persons of unstable nervous system are most subject to this form, and in them such causes as sudden emotion or excitement may induce temporary relaxation of the bowels. If indigestion be present, as it often is in these individuals, the tendency to diarrhœa is much increased, and hence the main object to be kept in view in dieting them is to raise, if possible, the standard of their digestive powers, restricting all such articles of diet as tend to worry a sensitive nervous system. A great deal may be done for the comfort of these patients by putting them upon a very simple diet, easily digestible, and not likely to irritate the mucous membrane of the bowels. This should be particularly attended to whenever they have to undergo any severe mental strain; for example, in the case of students going up for an examination, and in others of a like disposition when subjected to any similar strain.

Mucous Diarrhœa.—In cases where much mucus is passed with the motions, we conclude that severe irritation or actual inflammation of the mucous membrane exists, and in these instances much benefit accrues from careful dieting. Farinaceous substances, such as arrowroot, tapioca, or sago, with milk, form a suitable diet, and allay the irritation of the intestinal mucous membrane.

Fatty Diarrhœa.—A rare form of diarrhœa is that associated with the passage of large quantities of fatty matter in the motions. The explanation at first sight would seem to be an inability on the part of the system to digest fats; but in some cases, at least, the withdrawal of fatty articles of diet, and, as far as possible, the withholding of fat-formers, have not brought about a diminution in the amount of fat passed. On the contrary, instances of recovery from this form of diarrhœa are recorded wherein the giving of large quantities of olive-oil appear to have had a decidedly beneficial effect.

Temporary Diarrhœa.—In a passing attack of diarrhœa, due to temporary irritation caused by some indigestible article of food, the difficulty is usually at an end when the bowels have fully emptied themselves, and all that is required is to keep the patient quiet and warm, restricting him for a few days to a very simple diet, with the avoidance of everything difficult of digestion or likely to set up fresh irritation. During such an attack the diet should consist of milk, with some farinaceous food, such as rice, arrowroot, sago, or tapioca, in small quantities at a time, and at short intervals. The food should be taken neither hot nor quite cold, and where there is much prostration a tablespoonful of brandy should be given with at least every second supply of food.

Chronic Diarrhœa.—In all cases of chronic diarrhœa our ultimate object must be to improve digestion and to raise the tone of the general health. It will commonly be found that at first, at least, milk and farinaceous foods answer best, but in some exceptional cases very tenderly dressed meat and eggs are more easily digested. The rule that each supply of food should be small, and the interval between meals shorter than usual, applies here equally as in acute cases. Broths and strong soups usually tend to relax the bowels, and are inadmissible for these patients. So also are vegetables, except perhaps a mealy potato, but ripe fruits in very small quantities often agree well, and form a pleasant addition to the dietary. Bael fruit is much used in India in cases of diarrhœa, and on the Continent acorn coffee is found efficacious.

Alcoholic Stimulants.—A limited amount of alcohol is very often required, owing to the debility that usually co-exists with diarrhœa. It may be given with food in the form either of brandy or of a wine containing tannin, such as claret, burgundy, or St. Raphael.

Raw-Meat Treatment.—An entirely opposite diet, namely, that advocated by Trousseau, consisting of pounded raw meat and meat-juice, has been found useful in a class of cases where farinaceous food is not well borne. The diarrhœa associated with teething in young children sometimes yields to this treatment after resisting all other means. The pounded meat may be given with a little salt or sugar, or in jelly, or it may be strained into beef-tea, and given slowly by teaspoonfuls. If this diet does not carry with it sufficient liquid, the

quantity may be made up by giving water with some white of egg in it, and nothing else.

Coming now to the details of the different diets.

Dietaries.—Dietary in Simple Diarrhœa.—As has already been said, an attack of temporary diarrhœa, due to indigestion, will speedily yield, after the offending substances have been removed, to treatment by diet, aided by rest and warmth.

A teacupful of milk with a little arrowroot or an arrowroot biscuit powdered in it, milk and lime-water, or milk and ground rice with a little cinnamon, may alternate at intervals of about three hours, with a like quantity of tapioca or sago and milk. All these should have the chill taken off, but should not be hot, and should be taken very slowly.

Dietary in Chronic Diarrhœa.—In all forms of chronic diarrhœa, as previously remarked, the quantity of food given at a time should be small, and no full meals should be taken.

In a severe case of long standing, directions should be given for all the food to be taken very slowly, by teaspoonfuls, and at a very moderate temperature, that is, neither hot nor cold.

8 A.M.—A breakfast-cupful of rusks or "tops and bottoms" in boiled milk.

10:30.—A teacupful of warm milk, with an arrowroot biscuit.

1 P.M.—Any plain milk-pudding, such as sago, tapioca, with an egg in it, or a plain custard.

4 P.M.—A cupful of peptonized cocoa and milk, or of warmed milk, with a biscuit or a rusk.

6:30 P.M.—A meal similar to the midday one.

9:30.—A cupful of arrowroot.

Alternatives will be semolina-porridge, maccaroni pudding, prepared farinaceous foods, peptonized milk, and beef peptonoids, where these are well borne.

With the 10:30 A.M. food give, if required, from a dessert- to a tablespoonful of brandy, and from one to two tablespoonfuls at 6:30 or at 1 o'clock, and with the last supply of food. In other cases a glass of claret, burgundy, or St. Raphael at 1 and at 6:30 will be suitable.

As improvement sets in, a cupful of beef-tea, with plenty of farinaceous material, such as arrowroot or vermicelli, in it,

may be substituted for the milk at 10:30 A.M.; next, plain panada of chicken, or a little boiled fish at 1 and at 6:30 may be introduced into the dietary.

Dietary in a Mild Case.—For a mild case, or during the convalescence of a severe one, the diet should be somewhat dry, and breakfast had better be taken in bed.

8 A.M.—An egg, lightly boiled or poached, dry toast with a little butter, a small breakfast-cup of cocoa nibs.

10:30.—A cupful of milk and a biscuit.

1:30.—Chicken or plain panada, bread, and a spoonful or two of milk pudding. A tablespoonful of brandy in a half tumblerful of water, or a glass of claret or of burgundy.

5 o'clock.—A cupful of milk or of cocoa and a small biscuit.

7:30.—A slice of roast or of boiled mutton, or a chop; a very little grated potato and bread, or dry boiled rice; a little of any plain milk pudding or blanc-mange. The same allowance of stimulant as at the midday meal.

10 P.M.—A cupful of arrowroot, with a tablespoonful of brandy stirred in it.

Note.—To each of the preceding diets, if the meals be small and the total quantity of food taken in the day be not sufficient, a cupful of milk (peptonized) or of prepared farinaceous food, kept warm under a cosey during the night, should be added.

Acute Enteritis: Ulceration of the Small Bowel: Acute Gastro-Intestinal Catarrh.

When the Stomach is not Implicated.—If inflammation of the intestines exists by itself, and the gastric mucous membrane is but slightly or not at all involved, the diet should be selected and arranged so as to throw the main work of digestion upon the stomach. The aim must be to give those things that will be readily absorbed by the stomach, leaving little residue, that thus the intestines may be kept at rest. The foods that most fully answer these requirements are infusions of meat, meat jellies, and milk. These should all be given diluted, either iced, or at least quite cold, and in very small quantities at a time.

Gastro-Enteritis.—In the great majority of these cases, however, the gastric mucous membrane is affected to a

greater or less extent. When this is so, the question of diet is made also much the more difficult. The essential condition of healthy gastric digestion being then also interfered with, albuminoids are not well borne, as they decompose, and, by setting up irritation and flatulence, cause additional suffering to the patient. On the other hand, however, care must be exercised in the use of ordinary farinaceous substances. They, too, are apt to remain in the bowels undigested, inasmuch as the normal secretions are deficient and inactive. It is in such circumstances that prepared foods and artificially digested foods come in so usefully.

Prepared and Peptonized Foods: Ice.—What has been said regarding prepared foods in relation to gastric ulcer and gastric catarrh holds good in regard to the cases now under consideration with even greater force. When the secretions of the stomach and of the intestines are both at fault, it is of the greatest consequence that the food should be given in forms that are easily soluble and readily absorbed. Peptonized milk, peptonized gruel (with or without milk in it), peptonized beef-tea, and soups similarly treated are all most valuable in these cases. As already said, small quantities only must be given at a time, and in most cases it is better to give the food quite cold, or even iced. Thirst is best allayed by giving small pieces of ice to be sucked.

Nutrient Enemata.—When absolute rest for the stomach and bowels is necessary, then nutrient enemata must be resorted to. Beef-tea, peptonized, and with some prepared farinaceous food added to it, milk-gruel peptonized, meat peptones, and preparations of malt, with or without the addition of brandy, are typical forms of enemata, that convey a maximum of nutrient with a minimum of bulk. (For details see section on Gastric Ulcer and section on Prepared Foods.)

Inflammations of the Colon: Typhlitis: Dysentery.

As in inflammations of the small bowel, so here, in inflammatory conditions of the colon, it is of the greatest importance that the food should be of such kinds as are most readily absorbed, and that leave the least residue in the bowel. This helps to secure rest to the bowel, which is a step in the direction of cure.

Abstinence from Food.—In recent cases of acute inflammation without previous weakness, it is well to hold back supplies of food altogether for twelve, or even for twenty-four hours. By this means time is given for the removal of retained irritating substances, and, moreover, rest is greatly favored. If thirst be urgent, it is best allayed by giving small pieces of ice to be slowly sucked, or by allowing sips of iced water, but no large quantities should be permitted. Where it is undesirable to keep the patient so long without any food, milk diluted with iced soda- or seltzer-water may be given in small quantities at a time, or teaspoonfuls of meat-jelly.

The stomach is less seriously implicated, as a rule, in these cases than in those of inflammation of the small bowel, and it is fortunate that it is so, since nutrient enemata are very much contra-indicated.

Concentrated Foods.—During the acute stages the diet should consist entirely of meat-jellies, strong broths, beef-tea with sago, tapioca, or arrowroot; and milk, with saccharated solution of lime, or other form of alkali, in it. It is hardly necessary to repeat that these must all be given in small quantities at a time, and that none of the food should be taken hot.

Liberal Diet in Chronic Dysentery.—In chronic dysentery the diet must be very liberal, because these patients are generally weak and anæmic, but it must also be of the simplest kind, as easy of digestion as possible. Meat of the most tender kinds, such as chicken, game, or mutton, pounded meat, strong soups, strong beef-tea; milk with alkalies, arrowroot, tapioca, and other farinaceous substances, also the prepared farinaceous foods; peptonized beef-tea and peptonized milk-gruel; eggs beaten up in milk, etc. If bread be given, it should be in the form of toast or rusk, well soaked in milk or cocoa.

Alcohol.—Alcoholic stimulants are, as a rule, required, and the form will vary with the circumstances of the case, but first on the list will stand brandy, next dry sherry and good old port. Brandy or sherry may be combined with milk and egg beaten up in the form of egg-flip, or the spirit may be added to the prepared farinaceous foods.

Acute Peritonitis.

In almost every case of acute peritonitis, the question of how to maintain the patient's strength by sufficient nourishment enters largely into considerations of treatment.

Necessity for Rest to the Bowels.—It is absolutely necessary that the intestines be kept as much at rest as possible. The nourishment, therefore, must be in concentrated form, so as not to distend the digestive organs, and of such kind as to leave little or no residue, thus avoiding as far as possible any increase of peristaltic action.

Avoidance of Vomiting.—The difficulty most frequently is that food cannot be retained by the stomach, even when given in the simplest forms and in very small quantities at a time. Vomiting is by all means to be avoided if it be possible, and therefore feeding by the mouth has often to be greatly restricted, or altogether abandoned. It has already been pointed out, as being most essential, that the bulk of the food should be the least possible, and so, where the stomach does not reject them, small quantities of strong beef-tea, or of beef-jelly iced, or of iced milk may be given at frequent intervals—a spoonful at a time.

Artificially Digested Foods.—Artificially digested foods are very valuable in such circumstances, and greatly help to fulfil the indications of dietetic treatment in these cases. Peptonized milk is not palatable, but peptonized milk-gruel is much more readily taken, and is highly nutritious (Recipe 76). Soups, beef-tea, jellies, and shapes can be prepared in the same way, and form useful varieties (Recipes 77, 78). Two to three ounces given every two or three hours, even, help very much to tide over the worst times, and if the case proceeds favorably the amount may be gradually increased.

Alcohol.—Alcohol is frequently required in cases of peritonitis. The safest form is old brandy, but later on champagne may be given with safety and benefit. Thirst is best relieved by small pieces of ice allowed to melt slowly in the mouth.

Nutrient Enemata.—In cases where the stomach rejects all food, feeding by the mouth should not be persisted in, as it only increases the distress of vomiting and adds to the danger of the patient. In such cases, small nutrient enemata

must be relied upon to keep up the patient's strength, and the use of prepared and peptonized or predigested materials greatly increases their nutritive value.

Prepared Nutrient Enemata.—Carbo-hydrates, in the form of prepared farinaceous foods, or plain baked flour, with malt extract, peptonized milk-gruel, peptonized beef-tea, etc., with or without brandy as may be necessary, answer admirably for these enemata (*cf.* p. 557). A tablespoonful of such a food as, for example, Mellin's in an ounce of warm water, or two ounces of prepared milk-gruel, or a teaspoonful of beef peptones in an ounce of warm water, thrown carefully into the bowel three or four times a day, does much to sustain life.

(For fuller details regarding nutrient enemata, see chap. Nutrient Enemata; also Recipe 79.)

Typhlitis and Perityphlitis.

Rest to the Bowels and Small Residual.—It is of great consequence in cases of inflammation in and around the cæcum that the diet should be carefully arranged and selected, so that small quantities are given at short intervals, and that, while the food contains sufficient nourishment, it is small in bulk, and leaves but little residue to be passed down the bowel. The importance of rest to the bowels has been pointed out in speaking of peritonitis, and it is of almost equal importance in the cases now under consideration. The food should leave no bulky or irritating residual to worry the inflamed bowel. As in cases of peritonitis, the indications are best met by giving concentrated nourishment in small quantities at a time, and by the use of artificial digestive agents.

Four ounces of peptonized milk, or of milk-gruel, beef-tea, soup or jelly similarly treated, may be given every two hours. If a somewhat larger quantity can be well borne by the patient, six ounces may be given every three hours—the gruel, beef-tea, or soup being given once to three supplies of milk. (For the preparation of peptonized foods, see Recipes 74–79.)

Alcohol.—In young and strong subjects alcohol is not required, but in those of feeble and debilitated constitution, as in second attacks, a tablespoonful of brandy may be given with every second supply of food.

CHAPTER IV.

DISEASES OF THE LIVER, ETC.

Functional Derangements of the Liver.

Symptoms.—Patients who complain of headache, disinclination for any physical or mental exertion, sleeplessness, and depression of spirits, with dyspeptic symptoms, such as furred tongue, disagreeable taste in the mouth, loss of appetite, flatulent distention and constipation, attribute their troubles to the fact that their liver is out of order. In the main, the conclusion is a right one, and in confirmation of this view we find that the urine is dark, often loaded with lithates, and containing bile pigments, while the motions are scanty and of a pale straw-color, or even clay-colored and offensive.

Our knowledge of the action and uses of bile leads us to expect that such a combination of symptoms would result in cases where its secretion is disordered, for we know that bile has antiseptic properties, preventing decomposition in the contents of the bowel; that it gives color to the stools; that it promotes peristaltic action; and that, in conjunction with the pancreatic juice, it has considerable power as an emulsifying agent and solvent of fats.

Mode of Life.—When not associated with organic disease of the liver itself, or of any other important organ, or with malaria, functional derangements of the liver can usually be traced to an unhealthy and inactive mode of life. The patients are generally those whose primary digestion has been good. They have been accustomed to eat and drink freely, and they have taken very insufficient exercise. Continued indulgence in more food than the needs of the body require will of itself lead to derangement of the liver, and, when associated with indolent habits or forced inactivity, the disorder much more speedily results, more especially if to these causes be added worry and mental depression.

Association with Gout.—Persons of the gouty diathesis are very subject to liver disorders, which sometimes alternate with attacks of acute gout, and both may be traced to the same cause or combination of causes. The only hope that such people have of keeping well is by leading an active life, and being abstemious, both as regards meat and drink. When a quantity of nitrogenous matter in excess of the wants of the system and beyond the powers of the liver is consumed, part of the surplus is not converted into urea, but remains to be eliminated by the kidneys, as uric acid and urates, or laid up as gouty deposits.

Biliary and Renal Calculi.—The formation of biliary calculi, too, is associated with or dependent upon derangements in the functions of the liver. Usually continued liver disorder precedes the appearance of these calculi, and the same, moreover, may be said regarding renal calculi, of the uric-acid kind at least. Persons, then, who are subject to hepatic derangements should be extremely simple in their diet and active in their habits. They should walk or ride on horseback regularly, and should as far as possible avoid spending their lives in hot climates or keeping their houses and offices overheated.

Dietaries—Articles of Diet to be Avoided.—Coming to the details of the diet, it may be said that such persons should avoid all rich and highly seasoned dishes, as curries, pies, and pastry of all sorts, strong soups, foods rich in fats; salmon, herrings, eels, mackerel, and other fish of an oily nature; elaborate *entrées*, and made dishes of all kinds; also rich sweets and creams; cheese, dried fruits and nuts, likewise malt liquors, sweet and generous wine, such as sweet champagne, madeira, brown sherry, and port, must be prohibited.

Articles to be Used Sparingly.—They must use sparingly red meats, eggs, butter, sugar, cake, pudding, milk, and cream. They must be very moderate in their use of even light wines. If alcohol is taken at all, the safest form for many such patients is weak brandy or whiskey and water.

The diet may be arranged as follows:

Breakfast.—A small plate of very well-boiled oatmeal or hominy porridge and milk, followed by a cup of weak tea and a slice of toast with very little butter.

Or a bit of fresh white fish or a slice of bacon, with the tea and toast as above.

In summer fresh ripe fruits, such as strawberries or gooseberries, and other fruits or plain salads in their season may be added.

Luncheon.—Some vegetable soup with bread; or fish, with a little mashed potato or fresh green vegetable, bread and butter, with lettuce or watercress.

Beverage.—A glass of claret in water or one tablespoonful of spirit in a small tumblerful of water, or a glass of plain or of aërated water.

They may be allowed a cup of tea in the afternoon, with a slice of thin bread and butter, a rusk, or a plain biscuit.

Dinner.—(Two courses only, soup or fish, and meat, or meat and pudding.)

Plain soup, especially of the vegetable kinds, or fish, as sole, whiting, plaice, turbot.

Chicken, game, or tender mutton; mashed or grated potato and well-boiled green vegetables, such as spinach or stewed celery.

Any sort of plain milk-pudding, or shape and stewed fruit.

Beverage as at luncheon.

Nothing after dinner but a glass of cold or of hot water to be sipped before going to bed.

Acute Congestion of the Liver.

Acute congestion of the liver has to be treated dietetically, in a very different way from the congestions that result from long-standing heart or lung disease. When the liver is acutely congested, besides the symptoms of disturbance in the hepatic functions, already alluded to in speaking of functional derangements of that organ, there is enlargement, and usually some tenderness on pressure in the right hypochondrium. There is often also troublesome vomiting, owing to the irritable state of the stomach. So long as the symptoms are acute, the diet must be restricted, and the patient limited to the most simple forms of nourishment, such as milk diluted with an alkaline water, broths, beef-tea, weak tea, barley- or toast-water. If thirst be very troublesome, these latter may be sipped freely, or the patient may be allowed to suck small pieces of ice. The milk, broths, and beef-tea should be given in regulated quantities of a cupful every three hours, and to each supply should

be added a teaspoonful of powdered biscuit or other farinaceous substance, such as arrowroot, sago, or tapioca.

Avoidance of Alcohol.—Except in cases where weakness renders it an absolute necessity, alcohol in every form should be withheld.

When, after rest in bed, with warm applications and the use of cholagogues, and a diet as above sketched, the acute symptoms have passed off, the greatest care is still necessary in regard to what food the patient takes. The diet must be continued of the simplest kind, and for a long time the rules laid down in the section on functional disorders of the liver should be strictly adhered to. Most persons who have suffered from acute hypatic congestion do well to abstain thereafter from alcohol in any form.

Inflammations of the Liver (Acute and Chronic Hepatitis): Malignant Disease and Morbid Growths in the Liver.

Acute Stage.—In the acute stages the diet should be limited to liquid foods in the simplest forms, as directed under the head of Congestion of the Liver (p. 580).

In the early stages of chronic inflammations and of malignant disease, the patient's condition will be ameliorated by attention to the matter of diet. The directions already given for the dietetic treatment of functional disorders of the liver should be followed, with this caution, however, that the great need there is in such cases for maintainingthe patient's strength should never be forgotten; and hence, while diet cannot be too simple, it should be as nutritious and sustaining as the impaired functional activity of the digestive organs will permit.

Alcohol.—In inflammations of the liver, the use of alcohol is contra-indicated unless the patient's strength be greatly reduced, as, for example, after the opening of an abscess. In malignant diseases, on the other hand, wine and other forms of alcohol may safely be given in such quantities as the circumstances of each case render necessary at the time.

Diet in Gravel and Uric-Acid Calculus.

Uric Acid.—Excess of uric acid in the blood, and deposits of it in the urine, being very closely allied to the gouty state, it is not necessary to repeat all that is said regarding the

dietetic treatment of that condition (see chap. on Gout), or of the treatment of disorders of the liver (p. 578), with which both are intimately associated. It may, however, here again be remarked that the diet must be restricted in quantity as well as in certain articles. The nitrogenous elements, especially red meats, must be used in great moderation; and all rich heavy dishes should be altogether excluded, among these being numbered pies, pastry, sweets, sugar, and fruits containing much sugar. Alcohol, if permitted at all—and in some cases where it distinctly aids the digestive processes a small quantity is beneficial—should be given in diluted forms and free from admixture. Therefore, liqueurs, port, sherry, sweet champagne, and malt liquors are to be prohibited. Fish, white meats, with plenty of well-cooked green vegetables, and salads where they agree, should, along with a moderate amount of milk and of farinaceous substances, constitute the diet. Water is the best solvent and diuretic, but the quantity taken at meals should be restricted. Taken in moderation, between meals, and also the first thing in the morning and the last thing at night, it will not interfere with digestion.

In Children.—In the case of children and young persons who inherit the diathesis, a great deal may be done to prevent its fuller development in later life, by attention to these dietetic rules, combined with a simple active life, exercise in the open air, and suitable clothing.

Oxaluria.

Oxaluria may occur during the course of some chronic diseases, as, for instance, in phthisis, or it may appear temporarily in some persons after they have eaten such things as rhubarb, tomatoes, or unripe fruits. If persistent, it is associated with or dependent upon impaired digestion and imperfect assimilation of food.

No distinctive rules for diet, applicable to all cases of oxaluria, can be laid down, but in general it may be said that food should be moderate in quantity, and should not contain much nitrogenous material. The great point is to secure, as far as it is possible, in these persons complete assimilation, and thus prevent accumulation of waste matter. The diet that is most fully digested answers best, and the activity of the digestive organs should be promoted by fresh air and open-air exercise.

CHAPTER V.

DIABETES MELLITUS.

In no other disease, probably, are the beneficial effects of a well-chosen dietary so marked as in cases of diabetes; but in considering questions of diet in this connection, we require to keep clearly before our minds three very different conditions, namely—(1) diabetes mellitus; (2) simple glycosuria; (3) diabetes insipidus, so called, for which a better designation is polyuria.

Distinctions.—These three affections, although they touch each other in one or more points, are in reality widely separated as regards pathology, prognosis, and treatment.

Glycosuria not Diabetes.—The more or less continuous passing of traces of sugar in the urine, or the occasional and temporary passing of sugar in the urine in considerable amount, does not constitute true diabetes; and hence we must not diet all glycosurics as if they were diabetics, else, in some cases at least, we shall do more harm than good.

Diabetes insipidus likewise is mentioned in this connection only to be separated and made distinct from both the others, as, except the passing of a large quantity of urine, it has nothing in common with either.

Definition.—While there are many variations in the clinical history of cases of true diabetes, and all the symptoms need not be present in the same case at one time, besides the special symptoms referable to the urine, we shall always find at least some of those that constitute a well-marked group. The usually keen, or even voracious, appetite of the diabetic is, nevertheless, accompanied by progressive loss of flesh, although a large quantity of food is consumed by the patient. There must then be some defect in assimilation. It is this—a loss of power on the part of the organism to deal with starches and other carbo-hydrates. Our knowledge of the transformations that the carbo-hydrates undergo in the body during the

progress of digestion is by no means complete, but we know that they pass through certain stages which bring them into the circulation in the form of grape-sugar, and that as such they enter the liver, there to undergo further changes in the process of assimilation. It is when these latter changes do not take place that we have an excess of sugar in the general circulation, a condition of affairs associated with other symptoms of the group, namely, a tormenting thirst, a harsh, dry skin, a red beefy tongue, and a sweetish odor of the breath. The thirst, which is often a most distressing symptom, leads to the consumption of large quantities of fluids, and thus a high blood-pressure is kept up, rather favoring the rapid flow of saccharine blood from the liver, and also the secretion of a large quantity of urine. Urine containing an increased amount of urea, as well as a considerable amount of sugar, is necessarily of a high density, and often possesses acid irritating characters.

Pathology.—While it must be admitted that the pathology of diabetes mellitus is still very obscure, there are certain facts bearing on its dietetic treatment that should here be summarized, as they tend to clear our way in reference to the diets to be prescribed in different cases.

Mention has already been made of the fact that the power of assimilating starches and other members of the carbo-hydrate group is, in cases of diabetes, defective. The non-assimilation of these substances, so important to the nutrition of the body, results in wasting, often advancing to extreme emaciation, which is usually accompanied by a trying sense of weakness and weariness. There is, as already said, an excess of sugar in the blood, and it is passed off by the urine in place of being used or stored up for the needs of the body.

Importance of Maintaining Nutrition.—The condition of the patient is serious in proportion as the body is starved by excessive loss of sugar, and we may, in fact, to a great extent gauge the progress of the disease and the success or failure of dietetic means by the gain or loss in body weight that the patient manifests during the treatment. So long as nutrition is well maintained there its good hope that the patient will weather the storm; and, in observing the varieties in the clinical history of this disease in different subjects, we find that the cases that run the most favorable course are those in which,

while the chief symptoms remain in abeyance, the weight of the body keeps up or increases. In young subjects who are passing a large quantity of sugar, and who speedily become very thin and weak, there is far less hope of benefit accruing from a carefully regulated diet than in stout elderly patients whose digestive powers remain fairly vigorous, although they may continue to pass a large quantity of highly saccharine urine.

How far a Rigid Diet should be Enforced.—In cases, too, where the cutting off of all starchy and saccharine articles of diet is not, in a reasonable time, followed by distinct amelioration of the patient's condition, the outlook is not hopeful, and it becomes a serious question how far a strict diet should be rigidly enforced. If the adherence to a rigid dietary is followed by loss of appetite and disturbance of the digestive functions so great as seriously to interfere with nutrition, it will be necessary to try very carefully the effect of slight relaxations in the least important points, always, however, keeping up a strict watch on the effect of such changes in the dietary. The patient's reason must be convinced by a sufficient explanation of the necessity that exists for his self-denial, and thus his hearty and loyal co-operation will be secured. Even with the best resolutions on his part, there is danger of the diet becoming very tiresome, if not altogether unbearable, and he will require considerable force of will if he is to adhere strictly to rules.

Combination and Preparation of Foods.—Success in treatment will depend very largely on the trouble taken on our part in the combination and preparation of the foods that are allowable, so as to introduce as much variety into the diet as the necessary limitations will allow. The dietary must be satisfactory, not only with respect to the allowability of its constituents, but it must also, as far as is possible, satisfy the likings and appetite of the patient, and it must be suitable to his digestive powers. The directions must be written with precision; general instructions will not do in these cases. The permissible articles of diet must be clearly stated, and likewise those that cannot be allowed.

Rationale of Diet.—Starches and sugars must be excluded as far as it is possible to do so. By the exclusion of starches and saccharine articles of diet, the excess of sugar in the blood,

on the one hand, is reduced, and thus the urgent symptoms are relieved; while on the other hand, by supplying such foods as are highly nutritive, but yield the least amount of sugar, the body is supported. Thus, in view of the possibility of the cause which set up the diabetes being removable, both the negative and positive sides of the question are of the greatest importance.

The statement as to the total exclusion of starches and sugar is qualified for several reasons. Very few patients are found able to go on for many months, or even for years, upon an absolutely rigid diet; they cannot endure it, and we often find that by allowing them a little ordinary bread no serious harm is done. In fact, the strain is relieved, and they are able to carry out the treatment in other details with greater strictness. As said before, however, the effect of any deviation whatsoever form rules must be carefully watched.

Preliminary Steps in Treatment.—Before commencing treatment, the general condition of the patient should be carefully recorded, in order that there may be a definite standard of comparison, and his exact weight should also be taken. The urine, too, should be examined several times before the special diet is commenced. Then gradually the forbidden articles must be cut out of the dietary, sugar being one of the first to go. The quantity of bread taken must by degrees be limited, and what is taken must be thoroughly toasted, so as to prepare the way for bran or gluten bread. Potatoes are often greatly missed, but they too must go, and so must all foods containing much starch, such as sago, tapioca, maccaroni, etc., until we bring the patient on to the diet recognized as being most suitable for diabetics.

Dietaries.—Before sketching out the different meals, it may be well to give here a general list of things that the diabetic may eat, of those that he may eat but very sparingly, and of those that are injurious to him.

He may eat beef, mutton, and all kinds of butcher's meat except liver. Bacon and other smoked, salted, or preserved meats. Game, poultry, and other birds. Broths and beef-tea, or soups not thickened with any farinaceous substance. Fresh fish of all kinds, also salted, kippered, or otherwise preserved fish. Eggs prepared in any form. Butter and cream. Cream-cheese. Cheese, especially the poorer sorts. Bran or gluten

bread and almond biscuits. Spinach, Scotch kale, turnip tops, lettuce, cucumber, watercress, mustard and cress, and all kinds of green salad, endive, radishes, mushrooms. Pickles, vinegar, and oil. Unsweetened jellies, unsweetened creams. Custards without sugar. Walnuts, almonds, filberts, Brazil-nuts and cocoa-nuts, olives.

He may drink tea, coffee, and cocoa made from the nibs. Claret, burgundy, chablis, hock, dry sherry, whiskey, soda-water, Apollinaris, etc.

He may eat, but very sparingly, of turnips, cabbage, Brussels sprouts, French beans, cauliflower, broccoli, asparagus, sea-kale, vegetable marrow.

In this list, in the instances we have already given, will come ordinary bread or biscuits. In the matter of drinks, milk, brandy, and bitter ale may be here included.

He must not eat any form of sugar, wheaten bread, or biscuits. Sago, arrowroot, barley, rice, tapioa, maccaroni, vermicelli. Potatoes, carrots, beet-roots, parsnips, peas, Spanish onions. Puddings and pastry of all kinds. Fresh and preserved fruits in every form.

He must not drink sweet wines, effervescing wines, port wine, and sherry. Liquors, stout, porter, and all sweet ales, also cider.

Dietary for a Diabetic.—Breakfast.—Bacon or cold meat, preserved meats or tongue; eggs; fresh fish with melted butter, or fish preserved in oil; gluten bread and butter. Salad or watercress. Tea with cream, coffee or cocoa nibs with cream.

Luncheon.—Soup (not thickened). Mutton chop, cold meat, chicken, or game. Potted salmon or trout, lobster salad or plain salad. Bran or gluten bread. Cream-cheese or skim-milk cheese. A glass of claret or hock in effervescing water.

Afternoon tea.—A cup of tea with cream. Almond biscuits.

Dinner.—Soup or broth (not thickened). Fresh white fish with melted butter, or salmon with lobster-sauce. Brill with anchovy sauce, or cod with shrimp-sauce, or trout with parsley butter(without flour). Sweetbread, pig's cheek boiled, salmon or lobster mayonnaise. Pigeons with stewed mushrooms, ox palate. A plain joint, or mutton chop, or steak. Spinach, stewed cucumber, or brussels sprouts. Game of any sort. Gluten or bran bread and butter. Cream. Salad of any kind

and cheese. Almond biscuit. Claret, hock, or whiskey with any aërated water.

N.B.—For those patients who find it difficult to adhere entirely to unsweetened foods, saccharin comes in as a ready and safe sweetening agent, and is described by Dr. Pavy as an acquisition in the dietary of the diabetic. Owing to its immense strength as compared with sugar (nearly 300 times), a very small quantity only is required, and, used with ordinary care in very moderate quantities, no harm results from its employment.

Simple Glycosuria.

The term glycosuria is still not uncommonly used as a synonym for true diabetes, though its use as such is of more than doubtful propriety, seeing how different the two conditions really are and how much confusion of thought exists in regard to their relations the one to the other.

Distinction from Diabetes.—In speaking of diabetes mellitus the distinction between that disease and mere glycosuria has been mentioned, and our object now is to endeavor to make that distinction more emphatic.

The passing of a small quantity of sugar in the urine by persons who are apparently healthy is not uncommon, and it has even been asserted that a minute trace of sugar is a normal constituent of healthy urine. This matter, however, has been made a subject of careful inquiry by competent observers, and it seems now to have been conclusively proved that no sugar is to be found in perfectly normal urine. It is certain, however, on the other hand, that small quantities of sugar may be passed for considerable periods of time without being associated with any marked deterioration of health, and without the presence of any of the other symptoms that are found in true diabetes.

Temporary Glycosuria.—(*a*) In a considerable number of cases glycosuria is a temporary condition, existing during some passing disorder of health, and disappearing when that derangement has passed away. Again, sugar may be found in the urine of otherwise healthy persons after a meal at which sugar and starches have been consumed in larger quantity than the digestive organs of such persons can at the time cope with.

Gouty Glycosurics.—(*b*) The subjects of simple glycosuria are usually stoutish, middle-aged, or elderly people, frequently with markedly gouty tendencies, and more or less dyspeptic. They indulge freely in sweets and all forms of saccharine foods, and, as Dr. George Johnson in one of his lectures graphically puts it, "these are cases in which the taste for such food has survived the power of digesting it." As has already been said, this is a condition entirely different from diabetes, and patients who are the subjects of it do not require to be dieted with the same strictness that is necessary for diabetics.

In the majority of instances the patients are gouty, and, besides the presence of sugar, there is often a trace of albumin in the urine. This fact should at once put us on our guard, for we must not forget the existence of such a thing as "gouty kidney," and the greatest care should be taken not to diet the patient in such a way as to help on this tendency.

Danger of Kidney Disease.—If carbo-hydrates are to a great extent cut off and a large supply of nitrogenous food substituted, the extra strain thereby thrown on the kidneys may, in the circumstances, suffice for the production of that form of Bright's disease which we know is not uncommon in gouty subjects, namely, the contracted kidney. If we can, we must avoid the substitution of a greater evil for a lesser. In constructing a dietary, therefore, for glycosurics, this must be borne in mind, and, while the amount of saccharine food is carefully limited, care must be taken also not to burden them with an excess of albuminoid material. Their excretory capabilities are not of the best, and are therefore liable to break down if too heavily taxed. The glycosuric must not eat sugar, sweets in any form, chocolate, etc.; pastry, rich puddings, tinned fruits, dried or preserved fruits and nuts.

He must not drink sweet wines, sweet ales, stout, porter, liqueurs, sweet cider.

He may eat poultry and game, fish of all sorts, but preferably the lighter kinds, such as sole, whiting, turbot, brill, cod, trout. Sweetbreads, pig's cheek, or calf's head. Brown or white bread toasted. All kinds of green vegetables and potatoes.

He may drink claret, hock, chablis, dry sherry, brandy, or whiskey in water (plain or aërated), cocoa nibs or cocoatina, coffee, and tea, except where dyspeptic conditions forbid it.

The following articles of diet should be used in great moderation by all persons of a glycosuric tendency associated with a gouty diathesis:

Red meats, cured or salted meats, such as ham, tongue, etc. Preserved or kippered fish. Eggs. Fruits of all kinds, both raw and cooked. Cheese; beet-root, tomatoes, and rhubarb; pickles. Bitter ales, burgundy, port wine, brown sherry, madeira, and champagne.

Dyspepsia.—As a rule, gouty dyspepsia is an outstanding symptom in these cases; the patients complaining, some most of flatulent distention, and some most of acidity. The reader is referred for full details to the section on the diet for dyspeptics, and it need here only be remarked that each case must be specially investigated, and individual peculiarities or difficulties of digestion observed, so that the most appropriate diet for each may be arrived at.

Polyuria (Diabetes Insipidus).

When the diagnosis of simple polyuria has been arrived at, to the exclusion of true diabetes and diseases of the kidney, the dietetic treatment of the case, in the absence of any apparent definite cause, resolves itself into the question of how best to support the strength of the patient, and compensate for the loss the body sustains through the continuous drain upon it.

Liquids not to be Limited.—Experience proves that limitation of the quantity of fluid consumed by the patient is not followed by beneficial results, but rather, in these cases, tends to increase the difficulty of keeping up nutrition. While, however, the total quantity of fluid taken in the twenty-four hours must not be restricted, great benefit to digestion will often be brought about by preventing the patient from taking much liquid with, or just after, meals; and allowing him to use freely at other times simple drinks, such as barley-water, toast-water, lemon-juice and water, apple-rice water, tamarind-water, etc. (Recipes 19, 20, 21, 24.)

If digestive disturbance is a prominent symptom, the diet must be regulated to suit the powers of the patient's digestion, and in all cases the aim must be to enable the patient to assimilate an abundance of plain, substantial food, supplemented, if need be, by cod-liver oil and malt extracts.

CHAPTER VI.

DISEASES OF THE KIDNEYS

Acute Bright's Disease.

Removal of Inflammatory Products from the Kidney.—In dieting a patient suffering from acute Bright's disease, one fact to be kept prominently in mind is the difficulty that the system has in getting rid of its waste material, and especially of its nitrogenous waste. Another important point is, that the diet should be such as to assist in carrying off those inflammatory products by which we know that the tubules of the kidney are to a greater or less extent blocked.

In view of the hampered excretion of effete matter, the amount of nitrogenous elements in the food must be kept down, and in view of the second point, namely, to aid in washing out the products of inflammation from the uriniferous tubules, diluents must be given freely.

Water as a Diuretic.—Water is the best diuretic. Hot water and hot diluent drinks are doubly useful, as they not only keep up diuresis without irritating the kidney, but also because they promote the action of the skin, and in this twofold manner increase the excretion of waste.

Milk the Staple Food.—Diluted milk is the food that answers best, and skimmed milk has a high reputation as a diuretic. Buttermilk, whey, and koumiss are also useful. From two to three pints of milk, well diluted, given in the twenty-four hours, will in most cases be sufficient at first; but if the disease be protracted and tends to become chronic, a more liberal allowance of liquid food must be ordered, and broths may have to be added to the dietary. When milk alone is used, it should be given in divided quantities at stated intervals—half a pint every three or four hours, diluted with half as much hot water or effervescing water.

Diluents.—In the intervals between the supplies of milk, the patient may sip freely of diluent drinks, such as barley-

water, toast-water, or imperial (Recipe 21), but care should be exercised that they be not taken too hurriedly, or in such quantity at a time as to upset the stomach.

Chronic Bright's Disease.

Before considering the distinctions between different kinds of chronic Bright's disease, it is desirable to notice some points that, in relation to diet, are common to all forms of chronic renal disease or renal inadequacy.

Excretion of Nitrogenous Waste.—If we bear in mind the fact that the kidneys are the great agents in the work of excreting nitrogenous waste, it need hardly be pointed out that, if these organs are unable fully to perform their functions, an accumulation of nitrogenous waste products must necessarily take place in the blood. This is so to a greater or less degree in proportion to the extent to which structural changes have advanced in the "large white" and in the "lardaceous" as well as in the "cirrhotic" kidney. As soon, therefore, as we have evidence sufficient to prove that the kidneys are laboring, and are burdened by their work, we must endeavor to remove the strain by regulating the diet; and one clear indication is to limit the supplies of nitrogenous food.

Influence of Alcohol.—Another important point is the influence of alcohol on these patients. In cases of chronic renal disease, alcohol is badly borne, and unless there is some urgent reason for its use it should not be employed. While, therefore, such important hygienic measures as the wearing of warm clothing and other means of protection from cold, together with regular habits of living in every respect, are not to be forgotten, great importance attaches to the regulation of the patient's dietary, especially in regard to the use of animal food and of alcohol.

Origin of Chronic Renal Disease.—There may be a history of an attack of acute Bright's disease at some former time, which has left the kidneys permanently and progressively damaged, and has rendered them unable to stand the strain that, through ignorance of ordinary physiological laws, has been habitually imposed upon them. In many cases we can trace an habitual over-indulgence in food and drink. In some, chronic dyspepsia is prominent; and if we go a step further

back, in other cases we shall find that the liver is primarily at fault.

If the condition has not had its origin in an acute attack, it has probably crept upon the patient stealthily. The kidneys have for long been struggling to eliminate an excess of nitrogenized waste matter, and they have broken down in their efforts to rid the system of these products of imperfect digestion.

The discovery of albuminuria is made, perhaps, quite unexpectedly, and it is to be feared that too often the treatment is based rather upon an endeavor to control the loss and to supply the place of the albumin lost, than to relieve the kidneys from the strain under which they are suffering.

Danger of Over-Feeding.—In other words, the tendency is to over-feed the patients, and to forget that, though the loss of albumin in this way may be a serious matter, the real danger to the patient is the progressive degeneration of the kidneys, and the increasing retention in the blood of deleterious waste that necessarily ensues.

We may very probably not be able to remove the worry and mental strain that play an important part in the clinical history of renal cases, but we can at least so select the diet as to make the work of the liver, and consequently also of the kidney, as light as possible.

Necessity for Relieving the Kidneys from Overwork.—Excesses in eating and drinking may or may not be traceable as the cause of the renal disease in the particular case with which we are at the time dealing, but the consumption of a large amount of animal food and the free use of alcohol undoubtedly must be stopped if the mischief in the kidney is to be arrested. As has been already said, the supplies of nitrogenous food must be cut down, and alcohol must in most cases be struck out of the dietary altogether. We say in most, not in all, cases, because there probably is here and there an isolated example where the digestive processes do not go on so smoothly and perfectly without alcohol as when it is allowed, but the amount must be small, and the effect must be carefully watched.

When to give Alcohol.—If we can assure ourselves that digestion is more completely carried out with the aid of a small quantity of alcohol, then it must not be withheld. We

must, however, be very sure, and be ever on the watch both as to the quantity taken and the effect on the patient's general condition, as well as upon the amount of albumin passed.

Fluids and Diuretics.—Another matter of importance is the question of the quantity and kind of the fluids taken. It may be said in general that simple drinks, such as plain water, toast-water, barley-water, or the good old-fashioned cream-of-tartar and lemon drinks are all useful as diluents, and that they probably aid the action of diuretics. This caution, however, must be given—they should be sipped slowly, and not gulped down in large quantities, and they should be taken in the main between, and not at, meal-times, else they will frequently interfere with digestion, and do harm instead of good. In cases of granular kidney, especially where the changes in the vessels throughout the body are advanced, care is necessary in the amount of liquid taken, and in the manner in which it is taken, lest by over-pressure hemorrhages be induced or increased. In other forms of renal degeneration, too, where the heart is seriously implicated and there is much dropsy, if we find that liberal allowances of fluid have not a diuretic effect, and are not helping to free the system of retained poisonous matters, it is time to ask ourselves whether they are not doing actual harm.

Milk.—Milk has a great reputation in cases where the kidneys are at fault, but it must be remembered that, when it enters into a mixed dietary, milk does not always agree well and hampers the digestion of other foods, in some cases even causing a copious deposit of uric acid to appear in the patient's urine. In bad cases the use of milk as the sole article of diet is often attended with the happiest results, and this is so more particularly in the case of children. A purely milk diet generally suits young subjects, and its employment for a time is followed by abatement of the symptoms, and by the disappearance of albumin from the urine.

In a certain proportion of cases of chronic Bright's disease, persisting or recurring dyspepsia is a troublesome and difficult symptom to deal with, more particularly where there is also marked anæmia. In such circumstances questions of diet become more complicated, and each individual case must be judged by itself, the dietetic treatment that seems best at the time being adopted. It may, however, be here remarked that

these anæmic patients are not always benefited by a fuller dietary with an increased supply of animal food.

Milk Diet Alone.—If the digestive organs are so enfeebled that they cannot utilize the supplies of food given, no good, but only harm, will result from relaxation of the rules already laid down, and such patients will often be found to do best upon a diet of milk alone. It is remarkable how long this diet exclusively of milk can be maintained in the case of those patients with whom it agrees. Instances are well known of patients who have adhered to it for years with marked benefit to health, and while leading fairly active lives. Sometimes skimmed milk only can be borne, as the cream disagrees and causes dyspepsia, or the patients become too stout. On the other hand, the removal of the cream renders milk more constipating. Where, therefore, unskimmed milk agrees, and the patients do not put on too much flesh, it forms an admirable diet, supplying all that is wanted for the bodily needs, without excess of nitrogenous elements, and affording sufficient fluid to wash away effete materials.

Relapses.—In those cases where exacerbations of the symptoms occur from time to time, milk diet should be had recourse to, and the duration of that treatment will depend upon the circumstances of the case and the urgency of the symptoms. In the intervals a varied but carefully selected dietary should be employed. As a general rule, the milk will agree best if warmed, and taken in quantities of from half a pint to a pint at a time. The total amount consumed by an adult in the twenty-four hours should be from three to four quarts, if the strength is to be well maintained.

Dietaries.—Putting aside, for the present, cases in which a milk diet only is required, and coming to details of the ordinary diets, it will be apparent, from what has already been insisted upon, that animal food, such as beef, mutton, veal, lamb, or pork, should hardly find a place in the dietary of these patients.

Game and white meats, such as chicken, may be allowed in moderate quantities, say once a day.

Fish is not only allowable, but is a useful form of albuminoid. Fat bacon and ham need not be excluded if they can be well digested. Broths, with rice or barley and vegetables in them, fish-soups, and soups made with milk or cream, are all useful articles of diet. Well-cooked vegetables and salads, where

digestion is good, may be freely allowed, with the exception of beans, peas, lentils, etc., which have too much nitrogenous matter. Fruits, cooked and raw, are admissible. Pastry had better be omitted, but bread and butter, cakes not too rich in eggs, puddings, to which the same remark applies, and biscuits are not objectionable.

The dietaries, giving variations for different days, might be sketched as follows:

For the First Day.—Breakfast.—A plate of oatmeal, whole wheaten meal, or hominy porridge, with cream or good milk; bread or toast and butter; cocoa, tea, or coffee, with plenty of milk added.

Luncheon.—A bit of fish, with a little melted butter, some mashed potato and green vegetable. Biscuit or bread and butter.

In the afternoon.—A cup of tea with milk, a slice of thin bread and butter.

Dinner.—Soup, *purée* of potato, chicken, or rabbit, mashed potato, green vegetables, plain or milk pudding, with stewed fruit. Dessert.—Ripe fruit.

Beverage.—A glass of aërated water.

The last thing at night.—A glass of milk and soda- or seltzer-water.

Second Day.—Breakfast.—A slice of well-mixed bacon or fat ham may take the place of porridge, and be followed by toast, by bread and butter, tea, coffee, or cocoa, with plenty of milk.

Luncheon.—A basin of vegetable soup, a bit of cheese, bread and butter, and salad.

Afternoon tea.—Toast or rusk, tea filled up with milk.

Dinner.—A piece of boiled fish, butter sauce, a plain *entrée* with vegetables, milk-pudding or shape, stewed fruit or blanc-mange, biscuit or bread and butter, a glass of plain or aërated water.

At night.—Milk and soda-water.

Third Day.—Breakfast.—A bit of fish, fried or grilled, toast or bread and butter, coffee, cocoa, or tea, with plenty of milk.

Luncheon.—A milk-pudding with stewed fruit and cream, bread and butter.

Afternoon tea.—Cocoa or milk or weak tea, a slice of bread and butter.

Dinner.—Fish-soup, game or poultry, mashed potato, green vegetables, maccaroni-cheese. Dessert.—Ripe fruit.

Beverage.—A glass of plain or aërated water.

At night.—A glass of peptonized milk or of milk and soda-water.

CHAPTER VII.

SCURVY.

Curative Effects of Diet.—Experience is not wanting to prove that cases of scurvy are, in the absence of complications, rapidly cured by dietetic means, and that, without a proper arrangement of the diet, medicinal and hygienic measures, although valuable aids, will not of themselves effect a cure.

Scurvy is nowadays so much less frequently seen that the possibility of its existence in a mild form, under the influence of a very restricted diet, coupled with bad hygienic surroundings, is apt to be forgotten, and it is very probable that cases in which the unhealthy blood-state exists to a partial extent, and without the marked symptoms of the disease, are sometimes overlooked.

The exact nature of the changes in the blood has not yet been fully made out, but we know that scurvy never occurs except in circumstances where the diet is restricted, wanting in variety, and deficient in fresh fruits and green vegetables. When fresh vegetables and fruits cannot be obtained, lemon-juice is found to be the best preventive as well as a most efficient remedy.

Usually the digestive powers are not much impaired, and the patient is able to take ordinary food freely when it is reduced to pulp, as the inflamed state of the gums prevents the mastication of solids.

Danger of Syncope.—Bearing in mind the fact that in severe cases there is a great tendency to syncope, which has often proved fatal, the diet should at first be so arranged that the patient may obtain an abundance of nourishment, and still retain the recumbent posture even when taking his food.

Necessity of Soft Food.—Milk, broths, beef-tea, eggs beaten up in milk, potatoes mashed with milk, green vegetables, such as spinach mashed, pounded meat, chicken panada, ripe fruits, will be suitable early in the treatment, and a pleasant

beverage will consist of lemon-juice in water slightly sweetened.

Dietary.—For a severe case the following directions will be suitable:

7:30 A.M.—A cupful of milk, warmed.

8:30.—An egg beaten up in milk, or a cup of cocoa, with thin bread and butter, or a plate of well-boiled porridge with cream. These may alternate on different days, and should be followed by some fresh ripe fruit.

11:30.—A cupful of good broth, with plenty of fresh vegetables in it.

2 P.M.—Panada of chicken pounded and warmed, with bread crumbs, mashed potatoes, well-boiled and mashed green vegetables. Ripe fruits or stewed fruits and cream.

5 P.M.—A cup of cocoa with rusks or toast soaked in it.

7:30.—A meal like the two o'clock one.

10 P.M.—A cup of milk or prepared food.

Lemon-Juice and Stimulants.—As a beverage, lemon-juice, as already mentioned, will be grateful in most cases.

Malt liquors seem to have a decidedly favorable effect in most cases. In some, burgundy or brandy and water agrees best.

In less severe cases patients will be able to take larger meals at a time, and consequently the intervals between times will be longer.

The general directions as to the selection of foods will apply equally in these cases as in the severe ones, and the divisions will be into four meals—a good breakfast, a midday meal, afternoon tea, and dinner. In the lesser degrees of the malady, stimulants are not so necessary as in the severe cases.

CHAPTER VIII.

ANÆMIA.

Though our knowledge of the life-history of the blood is by no means complete, we are conversant with conditions arising in connection with well-marked changes in its constitution, and that are associated with defects in the processes of its formation.

Causes of Anœmia.—We know that the condition which we call anæmia, wherein the blood is deficient in its most important constituents, may arise under very different circumstances. It may occur in the course of such diseases as syphilis or chronic Bright's disease, and it may be associated with lead- or mercury-poisoning, or with malaria. In all these cases the anæmic condition is the outcome of the continued action of the poison in the blood, and the aim of treatment must be to remove the primary evil before much good can be expected from dealing with the anæmia. Simple or idiopathic anæmia, however, is a totally different condition from any of the foregoing, and the diagnosis can generally be clearly made out; leukæmia also being excluded.

The Anœmic Type.—Simple anæmia, of which alone we have now to speak, comes before us usually in the person of a young girl, about or just beyond the age of puberty, pale, puffy, and breathless, with impaired digestion, feeble circulation, and usually persistent constipation. For our present purpose we must consider first the state of the digestive organs, and we find that dyspepsia is more or less prominent. Obviously the diet must be modified according to the patient's powers of digestion, the constipation, that, as already has been said, is an almost invariable symptom, being also dealt with before the good effects of dietetic treatment can be obtained.

Simple Diet and Rest in Bed.—The more marked and long continued the anæmia, and the greater the consequent weak-

ness, the more simple must the diet be at the commencement of the treatment. My experience of severe cases of anæmia has led me to the conclusion that the speediest way to a cure is to keep the patient in bed for a week, or even for two or three weeks if the symptoms are very pronounced and the constitutional disturbance great. These patients have gradually failed because their expenditure has been greater than could be met by lessened powers of assimilation, and the rest in bed, especially in the case of girls who for some time have been struggling with their work, does wonders in bringing back the power of the digestive organs and restoring the balance between the wants of the system and the assimilation of nutriment.

Hygiene.—On the other hand, I believe that in many cases, in those, at least, in which the condition is of but recent origin, the patients would soon get well without any special treatment if we could place them in favorable hygienic circumstances as regards good food and fresh air, securing also the full and regular action of the bowels.

Use of Iron.—The known beneficial effects, however, of iron, combined with aperients, in the treatment of anæmia, lead us to resort speedily to its use in most cases without waiting for the result of other means alone. Thus, perhaps, we are inclined to give to iron too large a place in the treatment of anæmia, to the neglect of such other valuable means as a regulated diet, the use of aperients, fresh air, and suitable exercise, by all of which better assimilation and improved nutrition are brought about and established.

One point in this connection should be emphasized, and it is this: there is little or no good to be expected from the exhibition of iron when the digestive organs are seriously out of order and the bowels constipated. Therefore, it is often well to wait a short time before commencing to give iron in any form; and should this disordered state of things recur during the treatment, the iron had better be omitted for a short time, and then resumed gradually.

Severe Cases.—In severe cases of anæmia, then, the patient should be kept in bed for a short time at the commencement of treatment, in an airy room, with, if possible, a sunny exposure, and fed upon the simplest and most nutritious articles of diet in such forms as the weakened digestive organs can best utilize,

and at the same time with as much variety in the diet as possible. At this stage, meat cooked in ordinary ways cannot be digested, but strong broths and soups with pounded meat in them, and thickened with some farinaceous substance, milk and soda-water, milk-pudding, and other dishes made with milk, well-boiled green vegetables, and cooked fruits form the staple articles of diet.

Prepared and Artificially Digested Foods.—In cases where there is extreme difficulty of digestion, it is necessary for a time to resort to the prepared farinaceous foods, or the milk, the soups, and other things may be peptonized by the addition of, say, liquor pancreaticus (Recipes 74–78).

Alcohol and Cod-Liver Oil.—Two other things coming fairly under the head of foods, alcohol and cod-liver oil, should be here considered in their relations to these cases. Alcohol is seldom indicated or required in anæmia, but in cases of great feebleness it may be useful in the form of a glass of plain claret or light burgundy with luncheon or with dinner. In other cases, a glass of light brisk ale with these meals may be of service by stimulating the appetite and promoting digestion.

Under any circumstances, however, if given at all in anæmia, the quantity of alcoholic stimulant should be small, and it is hardly necessary to add that it should be given with food, not between meals or on an empty stomach. These patients are young persons, and it is highly important that they should not come to be dependent on the continuous use of alcohol. The stimulating effects are not what is wanted, and alcohol is useful in these cases only in so far as it promotes assimilation and improves nutrition.

The other is cod-liver oil, and there are several points that should guide us in its use. If cod-liver oil at all upsets the digestion it should not be persevered with, although it may be again given a fair trial after the disturbance has subsided, and in many cases it is a useful addition to the food supply, while it increases rather than diminishes the appetite. It can be given along with iron, and in that combination is often of decided help in enriching the blood. Where plain cod-liver oil cannot be taken, it is sometimes well borne in the form of an emulsion, with or without extract of malt, or the extract of malt may be given alone with the food.

Coming now to the details of the diet, and bearing ever in

mind the general principle already laid down, that the more digestive and constitutional disturbance there is the simpler must be the food, we should, in a case of severe anæmia, diet the patient as follows:

Diet No 1.—8 A.M.—A breakfast-cupful of bread and milk or rusks and milk, or of some prepared farinaceous food, with a teaspoonful of malt extract. (*Note.*—The bread and milk may be peptonized.)

11 A.M.—A breakfast-cupful of soup or of beef-tea, with pounded meat and some baked flour or biscuit powder in it. Mutton or veal broth, chicken-tea or rabbit-soup, may be used for the sake of variety, and should all be thickened as above directed.

2 P.M.—A milk-pudding with one egg in it. (*Note.*—The digestibility is considerably increased if the dry farinaceous material be first exposed to heat in the oven, and some malt flour added to it before the hot milk is poured over it.)

4:30.—A cupful of peptonized milk (Recipe 74), with a slice of thin bread and butter.

7 P.M.—A breakfast-cupful of broth or soup, as at 11 o'clock.

9:30.—A milk meal, as at 8 A.M.

During the night one to two cupfuls of warm peptonized milk or of peptonized gruel may be taken.

Gradual Enlargement of Dietary.—As the digestive powers improve and the strength of the patient returns, the dietary should be gradually enlarged, the prepared and peptonized foods being replaced by ordinary articles of diet. Broths with plenty of vegetables in them, pounded meats, well-boiled porridge, boiled fish, chicken, etc., will gradully lead up to chops and joints, while well-cooked green vegetables, stewed fruits, and plain puddings will by degrees be added.

Diet No. 2.—In cases where it has been necessary on account of the feebleness of the digestive organs to put the patient at first upon the simplest possible dietary, this second scheme of diet may be pursued when convalescence has fairly set in. In less serious cases it will be suitable from the first of the treatment.

Breakfast.—A lightly boiled egg, or a bit of plain fresh fish; brown bread and butter or toast; cocoa and milk.

11 o'clock.—A small glass of warm milk or a cupful of soup or broth.

Early dinner.—A chop or plain cutlet, or a slice of boiled mutton or any other light meat, such as game or poultry; mashed potatoes; well-cooked tender green vegetables; biscuits and butter.

Beverage.—A glass of plain or of aërated water.

Afternoon tea.—A cup of cocoatina or of warmed milk, a slice of thin brown bread and butter.

Supper.—A breakfast-cupful of soup, with the meat pounded and put into it, together with some farinaceous material which has been exposed to heat. A small milk-pudding, made as directed in diet No. 1.

Beverage.—A glass of milk and soda-water.

The last thing at night.—A glass of milk and hot water, or of gruel. (*Note.*—In early stages the gruel may be peptonized.)

CHAPTER IX.

SCROFULA.

While scrofula is undoubtedly very often inherited, it may, nevertheless, manifest itself in the children of parents who themselves could not be said to be actually scrofulous, though constitutionally delicate, or their health at the time their children were born may have been enfeebled by chronic disease or by age.

Acquired Scrofula.—Among the causes of what may be called acquired scrofula comes first of all improper feeding, usually associated with want of fresh air, and with altogether bad hygienic surroundings. This combination of causes obtains largely among the children of the poor in towns. In the case of poor country children it can hardly be said that fresh air is wanting to them during the day, but their food is often insufficient and wanting in nutritive value.

Insufficient Food.—The poor in many parts of the country have, for instance, great difficulty in obtaining for their children a sufficiency of good milk, and unhappily oaten cakes and home-made bread, both of which contain important elements of tissue formation, have been superseded in too many homes by ordinary baker's bread. The butter, too, that should be liberally supplied, is dear, and its place is too frequently taken by a scraping of jam or of treacle.

Results of Improper Feeding.—Among the children of the well-to-do classes, excessive and improper feeding, by keeping up chronic indigestion, acts almost as prejudicially as an insufficient supply of food or a diet of low nutritive value, and a deterioration of health as surely follows.

It is now many years since Sir James Clark, among others, pointed out the great importance of a properly arranged diet in reference to the health of children, and emphasized the fact that, even where the element of hereditariness cannot be traced, a disordered condition of system, induced and main-

tained by chronic digestive difficulties, often leads up to the manifestation of scrofula or of struma. It is apt to be forgotten that a condition of deficient nutrition may be kept up by an excessive and unsuitable dietary, as well as by one that is insufficient and innutritious. The lowered standard of health and strength that ensues is followed by scrofulous manifestations in those who, under more favorable circumstances, might have escaped them.

Wet-Nurse versus Unhealthy Mother.—In the case of the mother being pronouncedly strumous or phthisical, or even markedly delicate, the infant should not be brought up at her breast. A healthy wet-nurse, if possible, should be got, or, failing that, the milk of good country-fed cows should be obtained. It will give such children the best chance of growing up strong and healthy if they are reared in the country under favorable hygienic surroundings. After the first few months some farinaceous material will be added to the dietary, and of prepared infants' foods suitable for use in this way there are many excellent varieties.

Dietaries.—By degrees the quantities of food other than milk will be increased, until a diet such as the following will be suitable from about the age of twelve months:

7 A.M.—A teacupful of milk, with a good teaspoonful of Mellin's food dissolved in it.

10 A.M.—A teaspoonful of fresh whey with a tablespoonful of cream in it.

1 P.M.—The yolk of an egg beaten up in a teacupful of milk, or a teacupful of chicken- or veal-broth, with a teaspoonful of farinaceous food in it.

4 P.M.—A teacupful of milk, or a teacupful of whey with cream in it.

6:30.—A teacupful of beef-tea or mutton-broth with a powdered rusk or other farinaceous material stirred in it, or a teacupful of barley-water with the farinaceous material in it.

During the Night.—If the child wakes up he may be given a little milk, and if he wakes early in the morning he should have a teacupful of milk then, and not be compelled to wait till breakfast-time.

As the child grows older, even if the manifestation of the scrofulous tendency remain in abeyance, the care regarding diet must not be relaxed. The child should be encouraged to

take plenty of time over his meals, cultivating the habit of eating slowly, and learning to masticate all foods very thoroughly.

From the age of two or three years the diet might be as follows:

Breakfast, 8–8:30 A.M.—A basin of bread and milk; or a teaspoonful of cocoatina in a cupful of boiled milk, with bread and butter.

11 A.M.—A teacupful of new milk, with a rusk or a plain biscuit.

1:30 P.M.—A small piece of tenderly cooked roast mutton, pounded; a spoonful of mashed potato with gravy; a tablespoonful of milk-pudding with stewed fruit, or stewed fruit and cream in place of pudding.

4:30.—Bread and milk, as at breakfast, or a cup of milk with a spoonful of farinaceous food in it, or milk and cocoa with bread and butter.

Before going to bed, a cup of milk with a biscuit, and the same if he awakes early in the morning.

Use of Cod-Liver Oil.—So much for the diet of young children. Then there comes the question of cod-liver oil, which, since its first introduction, now a good many years ago, has been very extensively used in the treatment of such cases as those we are now considering, and in numberless instances with undoubted benefit. Although some children never overcome their first dislike to it, the majority take it readily, and many seem even to miss it when by chance it is omitted.

Different Types.—Cod-liver oil is a convenient form of giving fat, and the fatty constituents of food are much wanted, especially in one type of scrofulous children—the slim and thin, with a strong dash of the nervous diathesis in their composition. In these cases there can be no doubt of the value of cod-liver oil and malt. Better results are obtained under its use than in the thick-set, flabby, and somewhat heavy children, in whom the development of fat is not wanting, and whose nervous systems are by no means unusually active. In these latter the processes of nutrition are sluggish, and every means of promoting assimilative activity should be employed to induce more healthy growth, and to quicken their sluggish faculties.

Alteratives and Courses of Waters.—It is on this ground, no doubt, that alteratives, such as mercury and iodine, are sometimes useful, as are also courses of iodine and other waters; the active open-air life followed during a course of treatment at a watering-place is doubtless a most valuable adjunct.

Inunction.—In cases of great feebleness, where cod-liver oil cannot be taken, benefit is often obtained by the inunction of that or some other oil. While cod-liver oil is the most efficacious, its unpleasant odor is a serious objection to its use, and olive-oil will often be found a preferable substitute.

We have discussed the diet of young children who are strumous or have a tendency in that direction, and it remains only to be said that, wherever throughout youth the proclivity exists, a nourishing diet should be maintained, and should be aided by plenty of fresh air, and exercise in the open air, guarding only against violent games, lest injury should be done to the bones or joints, that are so apt to give serious trouble in the case of scrofulous children.

Uric Acid Diathesis.—Except in those cases where there is much deposit of uric acid, as sometimes happens, milk should be given freely, and indeed should form a staple article of diet. Well-boiled oatmeal porridge, brown-bread and butter, milk-puddings, cream in different forms, fruit, especially cooked, are all useful and desirable. It has been suggested that where, on account of the uric acid tendency, fruit would seem to be contra-indicated, it may be given if potash be used in the cooking, as one would do in the case of the gouty. There has been a prejudice against bread and potatoes for these patients, and no doubt a diet composed largely of these, without more nourishing food to supplement, is most injurious to organisms requiring liberal supplies of more concentrated nutriment; but mashed potatoes with cream or milk along with meat are excellent, and no objection can be taken to brown bread and butter occupying a subordinate place in the dietary. For a growing youth of the type we are now considering, the diet may be arranged as follows:

Breakfast, 8:30.—Well-boiled porridge and new milk, or milk with a spoonful of cream in it. A slice of fat bacon or an egg, with cocoa and brown bread and butter.

Dinner, 1 o'clock.—Meat in any tenderly cooked form;

mashed potato with milk or cream; well-boiled green vegetable; suet-pudding or milk-pudding, or stewed fruit with cream, or a plain cream and dessert.

Beverage.—A glass of water.

Tea, 6.—Fish with melted butter, or an egg, or a slice of fresh tongue; bread and butter, with cocoa.

Supper.—A glass of milk, or a cup of malted farinaceous food.

If it is relished, and does not spoil the appetite for breakfast, a glass of warm milk may be given at 7 or 7:30 A.M.

Alcohol.—It will be observed that alcohol is not included in this dietary, and there is seldom any necessity for a breach of the general rule that young people are better without any form of alcoholic stimulant. If the necessity for it is clearly indicated, the form and quantity must be decided by the circumstances of the case.

CHAPTER X.

GOUT.

Chronic and Acute.

A very great deal has been written about gout in general, and a great many theories have, at one time and another, been started regarding the pathology of the gouty state; but with these different theories I do not propose here to deal, except in so far as they have a bearing on the dietetic treatment of the disease.

Since gout is usually admitted to be the outcome and manifestation of an undue accumulation of nitrogenous waste in the system, the first questions respecting the dietary of gouty subjects that we have to ask ourselves are, What is the cause of this accumulation? and, What are the means by which it is brought about?

Excess of Uric Acid.—We know that the products arising from the oxidation of albuminoid foods in the body are uric acid and urea. In health, when the balance between the amount of albuminoid food taken and the waste, in the form of urea, got rid of, is well maintained, the quantity of uric acid in the blood is extremely small. In gout, however, not only can uric acid in considerable quantity be separated from the blood, but it may be found also, under similar circumstances, in the fluid of serous effusions. The balance is disturbed, and waste products that should be eliminated are retained in the system.

There are good reasons for attributing to the liver the chief part in the formation of urea, and it seems that so long as the liver can cope with the supplies of nitrogenous food ingested, the surplus waste is carried off by the kidneys as soluble urea, and the system is not burdened by an excess of uric acid.

Hereditariness and Predisposing Causes.—The hereditariness of gout is undeniable in many cases, but the circumstances in which we find it most frequently developed *de novo*

are where the individual continuously indulges in a diet composed largely of animal food, takes but little exercise, and is free in the use of wine or beer. In such a case there would seem to be two main factors at work—an excess of nitrogenous food, with deficient metamorphosis and elimination. In other cases the amount of albuminoid foods consumed may not be excessive, but the metamorphoses are not carried out to completeness. This is a sufficient cause of gout in many persons, and especially in those who have a marked hereditary predisposition to the disease. The worst combination of circumstances is where the activity of the liver is deficient and elimination defective, and yet the individual hereditarily predisposed to gout disregards dietetic rules and leads a life of inactivity.

Lead-Poisoning.—To the above list might be added chronic lead-poisoning, the subjects of which are very liable to develop gout. Fortunately instances embodying such a combination as we have just enumerated are not very common, for though the gouty man may not deny himself good living, he is frequently a person of much energy and considerable activity. Gouty people have often very good appetites, and often, up to a certain point, good digestive powers. It must not, therefore, be forgotten that the mere cutting down of meat in the dietary is not sufficient, if they continue to indulge in rich and undigestible dishes, and take as a whole more food than is necessary for the proper supply of the wants of the system. Although it may be doubted whether continued dyspepsia *per se* be sufficient to originate the gouty diatheses, there is abundant experience to prove that dyspepsia, sedentary occupations, and everything that interferes with the functional activity of the different organs of the body tend to set up the disease, and to keep it up, in those in whom the predisposition to it exists. The continued use of acids, for instance, or the taking of foods that tend to the undue production of acids during digestion, has a distinctly retarding effect on the elimination of uric acid, probably owing to the diminution of the alkalinity of the blood. Sedentary habits have already been spoken of; and other causes of imperfect elimination of waste products, such as defective action of the kidneys, inaction of the skin, etc., should be mentioned, for they are all potent in increasing the gouty habit.

Effect of Wines and Malt Liquors.—The free use of wines and malt liquours has undoubtedly a large share in the production of gout and in the keeping up of the gouty state. Port wine has been credited with the most powerful influence in this direction, but champagne, sherry, madeira, burgundy, and all generous wines have an almost equally marked effect. To most gouty subjects all malt liquors and ciders are almost as bad; but in some cases, where a very small amount of meat is eaten, a little malt liquor seems to be taken with impunity. Many gouty people find the use of milk in any considerable quantity, if persevered in for a short time, almost as trying to them as wine or beer, but there are some with whom, in the absence of butcher's meat, it seems to agree.

As to fruits, some would forbid them altogether to the gouty, but I cannot agree with that view.

Use of Fruits.—Alkalies added to Fruit.—I believe that the use of fruits, and especially of cooked fruits, is often beneficial, when they are taken in moderation. Very sweet and indigestible fruits, however, are not allowed, and there are some gouty dyspeptics with whom fruits of all kinds seem to disagree. They produce acidity; but even in the case of these persons the difficulty may often be got over by adding some bicarbonate of potash to the fruit before it is cooked. About an eggspoonful to the pound of ripe fruit, rather more in the case of unripe fruits, is sufficient.

Fats.—Neither do I believe that fats should be excluded from or too much limited in the dietary of the gouty, except in those comparatively rare cases in which they disagree and cause acidity. Where fats can be taken without upsetting the stomach they are useful as heat-producers, and they have probably less tendency to increase a deposition of fat in the body than the carbo-hydrates have. Then, again, as to sugar, although uric acid formation cannot be traced back to it, gouty persons should be very careful in their use of sugar, and they should altogether avoid ordinary sweets and sweet foods, on account of the tendency there exists for these materials in the gouty to turn acid. We have already seen that excess of acid is a most undesirable condition of affairs, and, indirectly at least, favors the production and continuance of gout in the system.

Necessity for Simplicity of Diet.—Limitation of Nitro-

genous Elements.—In the matter of fruits, however, as in all other details, each case must be studied by itself. No general rule can be laid down beyond this, that second only, if indeed it should be put second, to the limitation of nitrogenous substances, simplicity of diet is of the first importance, and is important, moreover, in several respects. As has already been remarked, gouty people have often good appetites, and they should not be tempted by a variety of dishes; in other words, their meals should be very simple. Dyspepsia, too, is an enemy ever ready to attack the gouty, and is frequently induced by indulgence in a too rich and complicated diet. While the dietary, then, must be a simple one, it must not be insufficient for nutrition, though the nitrogenous element should be small. Much animal food, therefore, is objectionable, and is so in proportion to its richness in nitrogenous material. White flesh, such as chicken and rabbit and fish, is preferable to beef, mutton, and lamb. Game, probably, stands midway between the strong red and the white meats. Sweetbreads, tripe, calf's head and pig's cheek are also admissible; but veal, pork, and all cured meats, with the exception of fat bacon, have to be omitted from the dietary. Of fish, the sorts to be preferred are the whiting, cod, sole, plaice, trout, and turbot. Salmon, herring, eels, mackerel, and all the coarser fish, such as pike, hake, and bream, are less desirable. Soups, and especially vegetable broths, are not to be prohibited, nor are shell-fish to those who can digest them without difficulty. Green vegetables, with a few exceptions, such as asparagus and tomatoes, are to be freely admitted.

Eggs, and dishes made with eggs, such as puddings, omelettes, and custards and cakes, have to be strictly limited. The same has to be said of cheese, and in the form of toasted cheese, souffles, or ramikins, should not appear in the dietary of the gouty. Nuts, dried fruits, and preserves had also better be omitted.

Value of Simple Fluids.—Gouty persons require a considerable amount of fluid to carry off waste products from the system, and it is to this solvent and eliminative action that the benefit often obtained in these cases by a course of "water treatment," either at home or abroad, is to a great extent to be attributed. It is no doubt combined with and aided by change of air and scene, more or less active exercise in the

open air, early hours, and simple living—all of which it is difficult for the patient to keep up at home. Under even his ordinary circumstances, however, the gouty man may obtain benefit from increasing the quantity of simple fluid that he consumes, provided he complies with this caution: not to take it at meal-times or directly after food. What is taken with meals should be inconsiderable in amount, and should be taken toward the close of the meal. A large glass of hot or of cold water sipped the last thing at night and the first thing in the morning is often of immense use by aiding the action of the bowels and liver, and helping to carry away excess of waste material.

Water as a Diuretic.—In an article on the action and use of diuretics published some years ago by Dr. Lauder-Brunton, he extols the value of pure water as a diuretic and as a means of removing waste products. In the case of gouty people he is in the habit, he says, of advising that a large tumblerful of water, with or without some carbonate or nitrate of potash in it, be sipped night and morning. He mentions a case in which a friend of his own, who had been a martyr to gout, kept himself quite well so long as he adhered to a rigid diet of white fish, or of fowl, fat bacon, bread and butter, milk-puddings, green vegetables, and a little claret. If he omits one or two of the glasses of hot water, symptoms of gout speedily show themselves.

My own experience has been that gouty people and persons of constipated habit, in whom also free action of the skin is not easily kept up, and who take little liquid beyond two or three small cups of tea or coffee in the day, are often greatly the better for a morning and evening glass of water taken in the manner already mentioned.

Articles of Diet to be Avoided.—To sum up, then, the following articles of diet must be avoided by all those whose livers are inadequate, and who have a gouty tendency, and it holds good even more strongly in the case of those who are actually the subjects of gout in some of its many manifestations.

Of meats: Pork and veal; duck and goose; all dried, salted, potted, or preserved meats, with the exception of fat bacon.

Of Fish: Mackerel, pilchard, and eels; all smoked, salted, kippered, or potted fish.

Eggs, sauces, and pickles, vinegar, lemons, and other acids.

Tomatoes, asparagus, and rhubarb. Pies and pastry of all kinds, "made dishes," blanc-mange, and all preparations containing much gelatin; rich puddings, omelettes, and cakes containing eggs; skim-milk cheese; nuts, dried fruits, jams, sweets of all sorts.

Beverages to be Avoided are : Malt liquor in every form, port, madeira, champagne, moselle, burgundy, and all other generous wines.

Articles of Diet to be Used Sparingly.—They must be sparing in the use of mutton, lamb, and tender beef (any but the tenderest beef is out of the question); salmon, herring and mullet, shell-fish; game; cheese, mushrooms, broad beans; sugar; sweet fruits, especially uncooked; milk; dry sherry and spirits.

Dietaries—Details of Diet.—Having stated the negative side of the question, we give now the diet in detail.

The first thing in the morning the patient should sip a large glass of hot or of cold water.

Breakfast.—A small piece of white fish, or a slice of fat bacon with little or no lean, a slice of bread and butter or of toast, not buttered hot, and a cup of weak tea with milk.

Luncheon.—A basin of some vegetable broth or of fish-soup with bread; or a milk-pudding, such as rice and milk, sago and milk, or maccaroni, followed by bread and butter. A glass of water.

Afternoon Tea.—A cup of tea, or of cocoa nibs, with biscuits or toast.

Dinner.—Fowl or rabbit, pigeon, or game, or calf's head. (Mutton or tenderly dressed beef may be allowed occasionally.) A little mashed or grated potato. Some green vegetables. A little stewed fruit, with milk-pudding or shape. Beverage. A couple of glasses of claret, or one to two tablespoonfuls of whiskey in half a tumblerful of water.

If it is found more desirable to have the most substantial meal in the middle of the day, the above dietary will answer if the dinner given be substituted for luncheon, which will then serve for supper.

Half a pint of cold or hot water before going to bed.

Acute Gout.

All that has been said in the previous section regarding the diet in gout applies to the dietetic treatment of the gouty diathesis and of gouty patients, between the attacks.

Restricted Diet during Acute Attacks.—During an acute attack the diet must be restricted, but the extent of the restriction will depend upon the age, habits, and condition of the patient. If the subject of the attack be old and of feeble constitution he will not bear the lowering measures that are not only useful but necessary in the case of a young and full-blooded person.

Meat and Alcohol, as a Rule, Excluded.—As a rule, it is best in all cases to exclude meat, more especially red meat, from the dietary, and, unless there be some special necessity for its use, to forbid also alcohol. In old people, however, with feeble circulation, accustomed to the regular and free use of alcohol, it will often be necessary to allow a small amount, but the quantity should be carefully regulated. Not more than from two to four tablespoonfuls of old brandy or whiskey will in most of these cases be required in the twenty-four hours, and the spirit should be given with or just after food, well diluted in plain or in potash water. If the kidneys be seriously at fault, the use of even this small amount of alcohol is of doubtful benefit, and its effect must be carefully watched.

Sthenic Cases.—In a young and strong subject the diet should consist mainly of farinaceous substances, and broths, made not too strong. In detail the diet may stand as follows:

8 A.M.—A cupful of bread and milk, or cup of weak tea with milk in it, and a slice of dry toast with a little butter.

10:30 A.M.—A cup of weak vegetable broth, or two ounces of milk with Vichy water or potash-water.

1 o'clock.—Rice, sago, semolino, or other farinaceous pudding, made without eggs.

4 o'clock.—A cup of weak tea, with milk and toast.

7 o'clock.—Broth or some farinaceous pudding, as at lunch.

10 P.M.—A cupful of thin gruel or of arrowroot.

Hot Water and Diluents.—He should sip half a pint of hot water twice or thrice daily between meals, and barley-water or toast-water may also be allowed. After the acute symp-

toms have subsided, boiled fish or a little bit of chicken may be given once a day, and the amount of nourishment otherwise very carefully and gradually increased.

Asthenic Cases.—In old or feeble and debilitated persons, the diets, as already pointed out, although kept on the same lines, must be more supporting; and therefore the broths, etc., given may be stronger, and beef-tea, chicken-tea, or an egg beaten up in milk may be added once a day to the list. Alcohol will also be necessary, under the restrictions already mentioned.

Protracted Cases.—If the attack is a long one, the patient becoming reduced and the pulse feeble, it will be necessary to relax the rules still further, and to allow a somewhat more nutritious diet, including fish, soups, and white meats, as well as the allowance of brandy or whiskey.

CHAPTER XI.

OBESITY.

Many persons who are decidedly very stout are yet apparently healthy, and it is a difficult matter to say at what point obesity becomes a morbid condition, though that it does so in a certain proportion of cases cannot be denied.

While a certain plumpness of body is desirable, yet an excess of fat, besides being unsightly, is a burden to its possessor, and many plans for reducing the superfluous fat have at different times been suggested.

Causes.—Excess of Food.—Obesity may be due to excessive indulgence in food, but this alone is probably not a common cause, and, moreover, thin persons are often much larger eaters than those who are stout.

Alcoholic Beverages, especially malt liquors and sweet wines, have a decidedly fattening effect in the case of many persons, and corpulent people are often large consumers of fluids.

Sex and Heredity.—Women more commonly than men become very stout, and heredity is to be looked upon as an important element in the clinical history of a case. Stoutness is to be found prevailing in some families, while others are lean, and cannot be fattened by any means.

Want of Exercise.—The want of sufficient exercise, by diminishing tissue change, favors obesity, and the stouter a person grows the more difficult does the taking of exercise become.

Gouty Diathesis.—Excessive fatness is also at times associated with the gouty diathesis; and to be effectual in such cases, treatment must be directed against that state.

Anæmia.—In anæmia, also, there is often a tendency to unnatural stoutness, which likewise yields to appropriate treatment.

It is rarely found that very stout people live to a good old age, but instances are on record of persons who, having been very stout, have been able to reduce their corpulence, and have lived on many years in the enjoyment of exellent health. If any plan or treatment for the reduction of corpulence be adopted, it should be commenced very gradually and carried out with great caution.

Sudden Change Hurtful.—Evil results have often followed sudden changes in diet, especially a great increase in the nitrogenous materials of the dietary, to the exclusion of the carbo-hydrates, by persons desirous of rapidly losing their superfluous fat. No sudden change in the mode of life should be rashly undertaken, and all extreme measures should be avoided.

Fatty Degeneration.—It is not to be forgotten that the heart and blood-vessels in these patients frequently undergo fatty change, and also that the kidneys, if not actually diseased, are often quite inadequate to the strain thrown upon them by a diet from which sugar and starches are almost entirely excluded, and which therefore consists very largely of nitrogenous materials. Upon such a diet, however, Mr. Banting reduced his weight by over three stones in a year, and, moreover, a return to ordinary diet was not followed by an increase of weight. The chief objection to the plan called after Mr. Banting is that the diet consists too largely of nitrogenous substances, and for many stout people it is dangerous to throw so much extra work upon the liver, and more especially upon the kidneys.

"*Banting.*"—Mr. Banting, in advocating his plan, forbids sugar and starches; milk and butter; salmon, herrings, and eels; veal and pork; potatoes, parsnips, beet root, turnip, and carrot; bread, except when toasted; pastry and puddings; beer and stout, champagne and port. He limited the quantity of liquids as well as of solids, and in reality a comparison of diets will show that his is not more than sufficient to maintain life in a state of inactivity.

His diet was as follows:

Breakfast.—Fish, bacon, beef, or mutton; one breakfast cupful of tea or coffee without milk or sugar, and one small hard biscuit, or one ounce of dry toast.

Dinner.—Fresh white fish, beef, mutton, lamb, game, or

poultry; green vegetables; a slice of dry toast; cooked fruit without sugar; two to three glasses of claret or of sherry.

Tea.—A cup of tea without milk or sugar; a biscuit or a rusk; two to three ounces of cooked fruit.

Supper.—Meat or fish, with toast, and a couple of glasses of claret or of sherry in water.

The amount of meat allowed at breakfast was five to six ounces, a like quantity was permitted at dinner, and about half as much at supper.

	Liquids.	Solids.
Breakfast, ...	6 oz.	9 oz.
Dinner, ...	12 "	10 "
Tea, ...	4 "	9 "
Supper, ...	4 "	7 "
	—	—
	26 oz.	35 oz.

Preponderance of Proteids.—A glance at this dietary shows the large preponderance of nitrogenous materials over the carbo-hydrates, and also the fact that the diet is a very spare one.

Ebstein's Diet.—Another plan, and one which has the recommendation of more variety, while it is also free from some, at least, of the objections of that followed by Mr. Banting, has been proposed by Professor Ebstein, of Göttingen. He excludes carbo-hydrates, sugar, all sweets, and potatoes. Bread is limited to about three ounces a day. Besides potatoes, he excludes carrots, turnips, parsnips, and beet-root, but allows aparagus, spinach, cabbage, and the leguminose vegetables freely. No sort of meat is prohibited, and he allows the fat as well as the lean to be eaten.

Professor Ebstein does not set strict limits to the quantity of liquid consumed, and he believes that the rules are better kept in the main and in the most important points, if some articles of diet which strictly would be forbidden—for example, potatoes—are allowed in very moderate quantities. The diet is thus kept from being so irksome, and the patient is able to persevere longer with it than he could otherwise do. It will be observed that in this plan, while the fats are not excluded, the rule against the carbo-hydrates is very strict.

Gradual Change.—In most cases it will be well not to be

too rigid, for the reasons already mentioned, and it cannot be too strongly insisted upon that the change of diet should be made gradually. Sugar, sweets, puddings, pastry, cakes, cream, sweet wines, stout, and beer should all be cut off. All farinaceous articles should be gradually reduced. Brown-bread and toast in limited quantities should be substituted for ordinary bread, or its place may be partially taken by gluten bread. Lean meats, including poultry and game, also eggs, should be taken in moderation. Fish may enter largely into the dietary, and all green vegetables, salads, and cooked fruits may also be allowed. As already said, all malt liquors and sweet wines must be excluded. Hock, claret, or other light wine may be allowed to the extent of three or four glasses a day, or a small quantity of spirits in water may be permitted; but the total quantity of liquid taken in the twenty-four hours should not exceed two and a half or three pints.

The corpulent should be encouraged to take exercise, and especially exercise in the open air; but any violent exertion is most undesirable, from the strain it would put on the heart and blood-vessels.

CHAPTER XII.

DISEASES OF THE LUNGS AND PLEURÆ.

Pulmonary Phthisis.

As in struma, digestive disturbances, with evidences of malassimilation and malnutrition, frequently precede the direct manifestations of the diathesis; so in cases of pulmonary phthisis, we are accustomed to see the signs of lung-mischief preceded, often for some considerable time, by chronic dyspepsia, with a disordered state of system and a lowered standard of health.

Wasting.—Phthisis is essentially a wasting disease, and the great object of all treatment, dietetic, therapeutic, and climatic, is to raise the standard of nutrition.

Niemeyer puts it thus: "Prophylaxis against consumption requires, in the first place, that when an individual shows signs of defective nutrition and a feeble constitution, especially if already he have given positive evidence of unusual delicacy, with a tendency to diseases which result in caseous products, he should be placed, if possible, under influences calculated to invigorate the constitution and to extinguish such morbid tendency."

Insufficient Diet.—"Among the influences by which a liability to consumption is acquired, or by which a congenital predisposition to it is aggravated, that of an insufficient or improper diet stands first."

Impaired Nutrition.—Where the difficulty of insufficient food does not meet us, we have often to face a condition of chronic indigestion, aggravated, it may be, by improper dieting. The quantity of the food may be ample, but the quality may be such as cannot be assimilated by the weakened digestive organs. The food may be too rich, too bulky, or too coarse. The result is the same in each case, namely, impaired nutrition. In a word, the diet must be adapted to the powers

of the constitution at the time, and it must be of the highest nutritive value that can be digested.

Small Meals.—In regulating the quantity and quality of the food, especially during exacerbations of the malady, the rule that a little thoroughly assimilated is better than a larger amount only half digested, must be kept prominently in view. In the majority of cases it will be found that the quantity of food give at a time must be less than in health, and consequently the intervals between the supplies must likewise be shortened. Consumptives find that a large meal lies heavy on the stomach, and often gives rise to distressing flatulence with acid eructations.

Distaste for Fat, with Progressive Emaciation, an Unfavorable Prognosis.—An unconquerable dislike to fatty articles of diet is an almost constant accompaniment of this disease; but fat bacon, butter, and cod-liver oil can often be taken without difficulty after the fat of fresh meat has become distasteful. The repugnance to fat seems to be associated with an inability on the part of the system to digest fatty foods, and coincident with this we usually find progressive emaciation taking place. Where the digestive functions are fairly vigorous, and fatty articles of diet are not rejected, the outlook is not nearly so bad as where the opposite conditions exist. In those cases, however, where dyspepsia is severe and intractable, and especially where there is a strong dislike to fats, with an almost entire inability on the part of the system to digest them, a hopeful prognosis cannot be given. In all stages of the disease it is necessary to keep as watchful an eye on the digestive functions as on the state of the chest, and quiescence of lung symptoms, without improvement in nutrition, should not satisfy us.

Improved Nutrition the Object of all Treatment.—When we come to consider the details of dietaries for these patients, we shall see that they must vary from time to time according to the condition of the patients, but under all circumstances improved nutrition is our aim and object. When the patient is confined to his room or to bed, the greatest care should be bestowed upon the sick-room cookery

Daintiness of Sick-Room Cookery.—Food must be served in the daintiest and most appetizing ways, and not too much at a time. Usually it is well that the patient should not know

what is coming; a little pleasant surprise sometimes aids a doubtful appetite. Even when all these conditions are most favorable, appetite must not always be relied upon as a safe guide, for we not infrequently find that the system is able to digest and assimilate more food than the slender appetite would incline the patient to take.

Temporary Restriction of Diet.—While insisting thus strongly on the necessity for as liberal a diet as possible, it is not to be forgotten that there are times when the diet must be temporarily restricted; as, for exmple, when the tongue becomes furred, and when such symptoms as nausea, feverishness, and hurried respiration show themselves. Then it is time to limit the amounts of red meat and of stimulant, and altogether to simplify the dietary.

Milk Diet.—If gastric disturbance is severe, it will be controlled much more speedily by restricting the patient for the time being to a diet composed entirely of milk and prepared farinaceous foods, given in small quantities at frequent intervals. If we are very hard pressed, it may be necessary to give little or no food by the mouth, and to resort to the use of nutrient enemata, but the danger of diarrhœa being set up, or of its being increased if it has already appeared, renders feeding by enemata a difficult proceeding.

In some cases nutrient suppositories are well retained and are less irritating. Rubbing the body with oil may in extreme circumstances help to sustain life, but the discomfort is great, and in the case of cod-liver oil, at least, the smell is a great objection. Neat's-foot oil and olive oil are in respect of smell less objectionable, but they are not so effective.

Pure Milk.—Milk, good unskimmed country milk, should enter largely into the dietary of the consumptive. Some patients can drink milk warm from the cow and digest it well. One advantage of taking milk in this way, obviously, is that it cannot be skimmed, and patients, therefore, get the full nutritive value of the milk. Many, however, can take milk only when diluted, for example, with hot water or with an aërated water, or when boiled and with some farinaceous material in it.

Diluted Milk and Whey.—When difficulty is experienced in digesting milk in the ordinary form, it should be diluted with an aërated water or with hot barley-water, or it may be peptonized. Other plans for taking milk have been recom-

mended, such as, for example, the "whey-cure"; but here the caseine being precipitated, and therefore lost to the patient, is a decided disadvantage; and whey should be given only when milk in other forms absolutely disagrees.

Koumiss.—Koumiss, the fermented milk of mares, was introduced into this country some years ago from Russia, and has obtained reputation as a beverage of considerable nutritive value in phthisis. Koumiss can be made at home from cow's milk, skimmed or unskimmed, the former closely resembling that made from mare's milk; the latter somewhat richer than the Russian koumiss, and therefore more nutritious where it can be digested.

Cod-Liver Oil.—Cod-liver oil has come to be regarded as an invaluable adjunct to the treatment of phthisis, and undoubtedly in many cases it is of the utmost use. It does not, however, suit all patients. Some have a great repugnance to it; and if this continues, with loss of appetite, the oil should not be persevered with. Although not the best form of fat, the readiness with which cod-liver oil is usually digested is a very great point in its favor, and it need not, as a rule, interfere with the taking of a plentiful supply of milk.

Times for Taking Cod-Liver Oil.—The time at which cod-liver oil is taken is of importance. Some patients can take it easily at any time without its upsetting their digestion, but most find that to take it an hour or an hour and a half after meals is most agreeable. Theoretically, also, this is the best time, for digestion has so far advanced that the oil will not be long retained in the stomach, but will be passed on to be digested with the other fatty constitutents of the food. Sometimes, for convenience' sake, the oil is taken immediately after meals; but where any difficulty in digesting it when taken soon after food occurs, the other plan should be tried. The quantity to be begun with should be small, as a rule not more than a teaspoonful twice a day, and this may gradually be increased to a dessert- or a tablespoonful twice daily. A few patients find that they can best take the oil in a single dose at bedtime.

Vehicles for Cod-Liver Oil.—As already said, many patients can take cod-liver oil easily; some seem to take it almost eagerly without admixture of any kind; but others prefer it shaken up in hot milk or in a little fresh lemon-juice.

Orange-wine or brandy and vegetable bitters, such as gentian and columba, are also pleasant vehicles to some; and for children the syrup of the iodide of iron, or Parish's chemical food, answers well. From ten to twenty minims of ether added to the dose of oil seem in some cases to increase its digestibility, and the same effect is produced by adding a small quantity of pancreatine powder or pancreatine wine, or by making it into an emulsion with liquor potassa, and disguising the taste by a drop or two of oil of cloves or of oil of cassia. Various combinations of cod-liver oil emulsified with malt extracts are sold, and form valuable preparations. It should also be remembered that in some exceptional cases the less refined forms of oil are better borne than the paler, purer oils.

Substitutes for Cod-Liver Oil.—Where cod-liver oil cannot be taken, mutton-suet, finely minced and dissolved in warm milk, is a useful substitute, and other oils, though far inferior to cod-liver oil in nutritive value, should be given where cod-liver oil causes too great repugnance, or where it manifestly disagrees.

Malt Extracts.—Next to cod-liver oil as additions to the ordinary dietary come malt extracts, which by their aid in the digestion of starches are oftentimes useful; and they may be given either plain or in milk, in effervescing waters, or in milk-puddings. In this connection, also, should be mentioned cream of malt, pancreatic emulsion, and similar preparations. As in other diseases where the digestive powers are feeble, prepared farinaceous foods are of great value, and the addition of liquor pancreaticus or of liquor pepticus helps greatly the complete assimilation of the food. In this way peptonized milk, peptonized gruel, peptonized beef-tea or soup (Recipes 74–78), and peptonized enemata (Recipe 79) are valuable resources.

Alcohol.—Bearing in mind the all-important fact that imperfect nutrition is the great difficulty against which we have to contend, we shall be guided in our use of alcoholic beverages by the effect they have upon digestion in each particular case. In early stages of the disease, and where food is well taken, they are, as a rule, not required to any great extent, or, if given at all, they should be combined with food, and the result carefully watched. If they do not unduly flush and excite the patient, and if the digestion of food is mani-

festly increased by their use, if more exercise can be taken with comfort, and a sense of general well-being is produced, we may be satisfied that they are doing good. If they produce opposite effects, the quantity taken is too large, or else they are altogether contra-indicated. The form of alcoholic stimulant is another important point, and one that cannot be decided on general grounds. Some patients do best on a glass of bitter ale with luncheon and with dinner, or with a glass of stout at these times. For others, some light wine, such as claret, hock, or chablis, is more suitable; others still can take only a small quantity of spirits, a tablespoonful of brandy in a beaten-up egg, or a like quantity of rum in milk, or of whiskey in water; and in our selection we must be guided by individual experience.

Diet of Delicate Children.—In regard to children, the greatest attention should be paid to the diet of those who have inherited, or who by untoward circumstances have acquired, a feeble constitution with more or less tendency to strumous manifestations, lest these be the forerunners of the phthisis that will show itself later in life. A consumptive mother should never nurse her own infant, and for such a one a good wet-nurse is far better than rearing by bottle. If, however, the bringing up of the child by bottle be unavoidable, it should, if possible, be reared in the country, and, failing that, great pains should be taken to secure the milk of a healthy, country-fed cow.

Value of Milk.—During the early months of its life, milk must be its sole food, and, later on, should still be the staple of its diet. Its place should never be taken by "pap," as it too often largely is, but some of the prepared farinaceous foods, mixed with the milk, may be used so long as the quantity of milk itself is not diminished. As soon as the child is old enough to masticate, it may be allowed biscuits and bread and butter, and taught to chew them well, in order to aid the development of the salivary secretions and to encourage the drinking of milk. A little tenderly dressed meat, some well-boiled, tender, green vegetables and stewed fruits, all of which carry with them useful salts, should early enter into the dietary of such children.

Hygienic Measures.—It need hardly be added that every means to improve the appetite and invigorate the constitution

generally should be fully carried out. Plenty of fresh air in rooms, an open-air life as far as that can be secured, freedom from continuous study, and removal, when it is possible, to such a climate as will permit of many hours of the day in winter being spent out of doors, are most valuable accessories. All this applies equally, and even more strongly if possible, to the period of growth succeeding childhood in girls and youths of delicate constitution. An open-air life, with plenty of every kind of healthful exercise, an abundant but simple diet, and limited hours of study give such young people the best chance of escape, and often work wonders in building up the constitution.

Dietary.—A diet such as the following will be suitable:

The first thing in the morning, a cupful of warm milk, or of milk warmed.

Breakfast, 8 A.M.—Porridge (oatmeal, whole meal, or hominy) and good milk; a slice of fat bacon or an egg, with brown bread and butter, and a cup of cocoa.

11 A.M.—A cup of milk and a small biscuit.

1:30.—Any plainly cooked meat, mashed potato, and well-boiled green vegetables, simple pudding, and stewed fruit.

4:30.—A cup of cocoa and a slice of brown-bread and butter.

7 o'clock.—A cupful of bread and milk, or of milk with bread and butter, and an egg if there has been plenty of air and exercise.

In some cases it will be desirable to give from one to two teaspoonfuls of cod-liver oil an hour or so after breakfast, and again after the evening meal; or to give a teaspoonful of malt extract with the midday and evening meals.

The diet we should advise for an adult threatened with consumption is as follows:

Early in the morning a cup of milk with the chill taken off, or a cup of milk flavored with tea, and a slice of thin bread and butter.

Breakfast, 9 A.M.—Fat bacon, fish, or eggs, or eggs and bacon, with brown bread and butter, *café au lait*, or cocoa and milk.

1 o'clock.—Chicken, game, or light meat, mashed potato, and green vegetables, such as spinach or tender cabbage. Milk-pudding, or shape, or custard, with cooked fruit. A glass of light bitter ale or a couple of glasses of light wine.

4:30.—A cup of tea, half milk, bread and butter, or plain cake.

7 o'clock.—A meal like the midday dinner.

Before going to bed, a glass of milk, or of prepared farinaceous food with milk, with or without a tablespoonful of spirit, as the circumstances may indicate.

Modification of Diet.—This diet must be modified to suit each special case. For example, if the patient cannot take the early morning milk without losing his appetite for breakfast, let him have an early light breakfast, and at 11 A.M. a cup of soup or of broth, with toast or a biscuit. Again, if, the evening meal is preferred early, let it be taken, say, at 6:30, and then give, about 9:30, a cup of rusks and milk or of arrowroot, with a tablespoonful of spirit. Arrowroot and brandy will answer well when there is any tendency to diarrhœa; and when such is the case, the green vegetables and fruit will have to be omitted for the time being. Moreover, if there be much dyspepsia, the diet may have to be still further simplified, and divided into smaller meals at shorter intervals.

Where the disease has become established, but there is an absence of fever, the following will serve as a type on which to work out a dietary suitable for the special case:

7 A.M.—A cup of milk, with a tablespoonful of rum or other spirit in it, or a cup of milk with a little tea in it, and a slice of thin bread and butter.

Breakfast, 8:30.—Eggs, or egg and bacon, or fish with a little melted butter, or porridge and cream, bread and butter, a cup of *café au lait* or of cocoa.

11 A.M.—A small cup of soup or of beef-tea, thickened with some farinaceous material.

Early dinner, 1 o'clock.—Any tender, well-cooked meat, especially mutton, chicken, game, with mashed potato, and green vegetables of the tenderer sorts; any simple pudding or stewed fruit.

Beverage.—Half a pint of light bitter ale or of stout, or a couple of glasses of claret or of chablis.

4:30.—A cup of cocoatina, or of tea with plenty of milk, and a slice of bread and butter, or cake or plain biscuit.

7 o'clock.—A light but good meal of fish or chicken, or sweetbread or tripe, with dry boiled rice or bread; plain cream or jelly, a couple of glasses of light wine, or two tablespoonfuls of spirit in a little water.

9:30–10.—A cupful of prepared farinaceous food, or of arrowroot with a tablespoonful of brandy in it.

Hectic Stage.—During the continuance of fever, and in the later stages of consumption generally, the diet, as has already been pointed out, must be greatly simplified and limited mainly to liquid food. Moreover, since the quantity taken at a time will be small, the intervals between the supplies must be short —two hours, or even less. It is often well to adhere to the hours of ordinary meals, and to give the other supplies as intermediates. Although there may not be much difference in quantity or even in the kind of food, still it is less monotonous for the patient. Milk with an egg beaten up, or some malt extract or spirits in it, mutton or chicken broth, or beef-tea thickened with some farinaceous food, lightly boiled eggs, sweetbread, chicken, game, and fish, with custard, jellies, and plain puddings, will give variety to the meals. It is often well of peptonize the milk, or to dilute it with barley-water, or even with an aërated water. Alcohol is most useful at this stage of the disease, and generally agrees best in the form of old spirit or of dry sherry, marsala or of a light port.

Thus, early in the morning (an hour and a half to two hours before breakfast), a glass of milk warm, with a tablespoonful of milk or of brandy in it.

Breakfast, 8:30.—A cup of weak tea with milk, or of *café au lait* with an egg beaten up in it, with some thin bread and butter, or toast and butter, or rusk, or, if the patient prefers it, an egg lightly boiled or poached on toast, with a small cup of tea filled up with cream.

10:30 A.M.—A cup of "whole" beef-tea, or of good soup or broth, with a finger of toast.

Luncheon, 1 o'clock.—A bit of chicken or chicken panada, or sweetbread, or white fish with rice or bread, a spoonful of blanc-mange, or jelly, or plain cream. A glass of wine or a tablespoonful of spirit in a claret-glassful of water.

4 o'clock.—A cup of tea as at breakfast, or of cocoa and milk (preferably peptonized), or of milk and Mellin's food.

Dinner, 6:30.—A meal like luncheon, but of course varied as much as possible. Chicken, rabbit, sweetbread, or bird, or fish, such as sole or whiting, with a little melted butter; a spoonful of custard or of milk-pudding, a glass of wine or a tablespoonful of spirit, as at luncheon.

9:30–10.—A cupful of arrowroot, or of some prepared farinaceous food, with milk and a tablespoonful of brandy. Some peptonized milk or prepared food, kept warm under a cosey or heated by a spirit lamp, should be within reach during the night.

Diarrhœa.—Diarrhœa occurring in the course of phthisis calls for careful attention and demands strict dieting. It will often be sufficient to exclude from the dietary, for the time being, fruits, vegetables, brown bread, and soups; to limit the amount of meat, and to give chiefly milk, prepared farinaceous foods, arrowroot, and brandy, taking care that the quantity given at a time is small, and that nothing is taken either hot or very cold. For further details of treatment, the reader is referred to the section on Diarrhœa (p. 569).

Constipation.—Constipation is sometimes troublesome in phthisis, and it should be dealt with as directed in special section dealing with that subject (p. 568). It must, however, be remembered that there almost invariably exists a great tendency to irritability and catarrh of the bowels, not to speak of ulceration, and that therefore the greatest care should be exercised, lest, by treating constipation too vigorously, the opposite condition, of diarrhœa, be set up.

Asthma.

In most cases of asthma apart from those that merit the distinctive title of "peptic," dietetic measures greatly aid medicinal treatment.

Digestive Disorders.—Even if some error of diet be not the immediate exciting cause of the attack, a disordered condition of the digestive organs sooner or later ensues, and greatly aggravates the patient's state. Asthmatics are more or less dyspeptics, and they must be treated as such. Their diet should be carefully regulated. Bulky foods should be avoided, and not only the kind of food taken, but the times of eating must be specially arranged. Breakfast and midday dinner should be the chief meals, and no such thing as a regular late dinner or supper is to be permitted.

Small Evening Meals.—A small early evening meal of the simplest sort only can with safety be allowed. As a general rule, bulky green vegetables, much fruit, and any large quan-

tity of starchy foods, which might distend the stomach and bowels, are to be carefully excluded from the dietary of the asthmatic, and he should be warned against taking much liquid of any kind with meals. Tea, effervescing beverages, and soups are to be taken, if at all, in the strictest moderation, while, of meats, mutton, chicken, game, and fish are to be preferred to the less digestible forms.

Alcohol.—Alcoholic stimulants are necessary in cases where there is much depression and weakness, and where they seem to aid digestion, but their use is to be most carefully watched and limited. Strong coffee is so useful to many asthmatics at the time of a paroxysm that its habitual use is not recommended, since this would tend to lessen the benefit derived from it at those times.

What has just been said regarding the diet of asthmatics generally, applies with even greater force when they happen to be placed in circumstances that notably favor an attack.

Dietary.—The following may be taken as the type of a diet embodying the important points suggested above:

Breakfast.—Fresh fish, or chicken, or game, or bacon, or egg and bacon, with toast or brown bread and butter, and one cup of cocoa nibs.

Early dinner (four to five hours after breakfast).—A plain, substantial meal of two courses. Fish and meat, or meat and pudding; any tender, well-cooked meat, with a little green vegetable well boiled and mashed, plain pudding, or shape and stewed fruit.

Beverage.—A glass of water, with or without a glass of some light wine, or a small glass of bitter ale.

Evening meal, 6 or 6:30.—An egg lightly boiled and a slice of bread and butter, or an egg beaten up in milk and a biscuit, or a cupful of prepared farinaceous food, such as Mellin's or Benger's.

Modification of Diet.—It may be difficult at first for the patient to get accustomed to having no more substantial food in the latter part of the day, but the benefit usually derived from a plan such as the above will reconcile him to the change, and, a sufficiency of nutriment being taken at the morning and midday meals, the light evening repast will prevent a feeling of exhaustion and sleeplessness. At first, however, it may be necessary with some patients to let them down easily by per-

mitting a cup of cocoa or weak tea to be taken about five o'clock, and a small evening meal like the above given at seven, assuming that the patient does not go to bed till ten or later. The evening meal, however, should in any case be taken at least three hours before bedtime.

Pulmonary Emphysema.

While the treatment of pulmonary emphysema resolves itself largely into the question of treating the complications and secondary conditions that sooner or later manifest themselves, the diathesis of the patient should be kept prominently in view, and every means should be employed to improve the general health. In this way degenerative changes may be retarded or checked, even if past mischief cannot be repaired.

Gout.—If the patient be gouty, he must be dieted accordingly, only it should be borne in mind that in permissible things he is not to be too greatly stinted.

Cod-Liver Oil.—In addition to ordinary simple, nourishing foods, cod-liver oil may often be given with advantage, especially in cold weather.

State of the Lungs.—Attention to the state of the system generally is most important, and, while the condition of the digestive organs, the action of the skin and bowels, the influence of fresh air with gentle exercise, and the effects of climate must each and all be kept in view, the state of the lungs themselves must not be forgotten or overlooked. With usually a considerable decrease in size, there is always diminished activity of and retarded circulation throughout the lungs, and consequently a corresponding diminution in the processes of oxygenation. Add to this the fact that the patients are restricted in muscular activity, and it is evident that the diet must be adapted to the altered circumstances if the patient is to be saved unnecessary discomfort and increased dyspnœa.

Diet as for Asthmatics.—In many respects the rules laid down for the diet of asthmatics will be found suitable in the cases now under consideration. In most points the diets will be similar, and more particularly in those instances—and they are not a few—where there exists a marked tendency to spasmodic dyspnœa. The diet should in all cases be nutritious, and it should be somewhat concentrated, although at the same time

due regard must be had to variety and to promoting the action of the bowels. Care must be exercised that the stomach and bowels be not distended by bulky articles of diet, inasmuch as such distention is a fruitful source of dyspnœa. The meals must be small, and the main portion of the food should be taken early in the day, no late dinners or heavy suppers being permitted.

(See Asthma, p. 631.)

Chronic Bronchitis.

As regards the diet in cases of chronic bronchitis, it may be said in a general way that lowering measures are not called for, and that the patient requires a liberal supply of light, nourishing food.

Diathesis.—The question of the patient's diathesis must likewise be taken into account. A gouty tendency is frequently present, and must not be overlooked in arranging the dietary. Moreover, the condition of the liver and of the kidneys demands consideration; and, lastly, a very important point is the question of cardiac complications. In cases where the heart is weak, or where there is chronic valvular insufficiency, the directions given for the dietary of such patients (see chapter on Chronic Heart Disease) should be followed.

Dietary.—Regarding uncomplicated cases of chronic bronchitis, while the food should be simple, light, and easy of digestion, it should not be bulky, and the amount of liquid in the dietary should be small.

Dry diet.—A somewhat dry diet helps in many cases to diminish abnormal secretion, and for the details of such a diet the reader is again referred to the section on chronic cardiac diseases.

This applies also to cases of bronchiectasis.

Pleurisy with Effusion.

Active measures for promoting the absorption of the fluid are usually resorted to, but it is frequently forgotten that great benefit may accrue from a reasonable limitation of the amount of fluid that the patient is allowed to consume. In dieting a case of this nature, the facts to be kept chiefly in view are the necessity that exists for maintaining the patient's

strength and for promoting the absorption of the fluid. Regarding the latter point, it is scarcely necessary to point out that free elimination by the kidneys, skin, and bowels is of comparatively little use if the amount of fluid taken into the system be not diminished.

Dry Diet.—This necessity for limiting the liquid part of the diet is not usually made prominent by writers on the treatment of pleurisy, and it has not received the attention it deserves. Patients find it difficult at first to limit the quantity of liquid taken in the twenty-four hours; but if the plan be not pushed too much at first, and if the object of the restriction be pointed out, the necessary curtailment can usually be secured without difficulty, and, after the first day or two, without discomfort.

Diaphoretics, Diuretics, and Purgatives.—It has been recommended that this treatment by dry diet should be tried only after the use of diaphoretics, diuretics, and purgatives has failed, but there is no reason why in most cases it should not be tried first, or in combination with other means, and not as a last resource before tapping the chest. Diuretics are uncertain in their action, and strong purgatives of the drastic class are trying to the patient, besides being in some cases absolutely contra-indicated; but free diaphoresis, as, for example, by jaborandi, is undoubtedly useful in many instances.

It must not be understood that in advising a dry diet the total exclusion of liquids from the dietary is advocated. Such a diet is extremely irksome and trying to the patients. By some it cannot be borne; in fact, they would rather have thoracentesis at once performed, and, under proper precaution, that operation may be considered perfectly safe. Even after withdrawal of the fluid, however, a moderately dry diet is useful, especially in cases where there is a tendency to reaccumulation.

Dietary.—In detail the diet recommended is as follows:

8 A.M.—An egg or a piece of bacon, with toast and one small teacupful of cocoa, or a cupful of bread and milk (the milk being about a teacupful).

10:30–11.—Three or four little sandwiches of pounded chicken and bread, with a small glass of wine.

1–1:30.—Fresh white fish, or panada of chicken or game, or a piece of boiled chicken with a spoonful of mashed potato

and a little well-boiled green vegetable. Following this, if the appetite is good, a few spoonfuls of any light pudding.

Beverage.—From one to two glasses of light wine, such as hock, chablis, or claret.

4:30–5.—A small cup of milk or of cocoa or of weak tea, with a slice of thin bread and butter.

7–7:30.—A meal like the midday one.

10:30.—A teacupful of arrowroot, with a dessertspoonful of brandy in it, or a teacupful of Mellin's or of other farinaceous food.

In long-continued cases, and in weakly persons, cod-liver oil is a valuable addition to the dietary.

CHAPTER XIII.

DISEASES OF THE HEART.

Chronic Valvular Heart Disease, Weak Heart, and Fatty Heart.

In cases of valvular disease of the heart, so long as compensation is maintained the patient does not suffer from the valvular insufficiency, and he may even be perfectly unaware that his heart is affected at all. So soon, however, as the compensation becomes disturbed, the balance of the circulation is destroyed, and the mechanical effects of such a condition manifest themselves.

Symptoms.—The pressure in the systemic arteries becomes less, and that in the veins greater, causing in a very short time a back tide on the lungs, the liver, the stomach, and the whole portal circulation.

Flatulence, with Inactive Liver and Bowels.—The patient complains of a feeling of fulness and weight in the stomach. The liver is inactive, and the bowels are very sluggish in their action. Flatulence is often very troublesome; the urine, somewhat diminished in amount in the earlier stages, is loaded with urates; in the later ones it is scanty and contains also albumin. How can we in such a case help our patient by the regulation of his diet?

Selection of Food.—Two things are evident—the food must be easy of digestion, and it must not be bulky. If the food be slow in digesting or bulky in character, flatulence, which we have already said is often a very troublesome symptom in such cases, will be increased, and as a direct result there will be impeded action of the heart, with all its distressing consequences.

Directions.—Food, then, must be given in the most easily digested forms, in comparatively small quantities, and at moderate intervals.

Early Stage.—If the patient has sought advice early, be-

fore the pathological conditions above mentioned have become marked, it will suffice for his comfort and well-being that we direct him to divide his supplies of food into four small meals a day, and to eat red meat only once a day, and that at the principal meal; to make the evening meal a light one; to limit the quantity of liquid taken at meals, as well as the whole amount taken in the twenty-four hours; and to avoid everything difficult of digestion. Under this head we shall class cured meats, pork, salted or smoked fish, shell-fish, pastry, rich puddings, much or strong tea and coffee, and all effervescing beverages.

Later Stages.—When the early stage has been passed before the patient comes under our care, we shall have to select carefully the most suitable articles of diet for his particular case, and we must with equal care regulate the times of eating, and the quantity of food taken at a time. The meals must be small and the intervals short. Some food must be given before the patient undergoes the fatigue of dressing, and therefore we order a light breakfast in bed.

8 A.M.—A lightly boiled egg or a small piece of fresh white fish, with two small slices of dry toast and a little butter; one small cup of tea, not strong, and with plenty of milk in it. If the egg cannot easily be taken in any other form, it may be eaten up in the tea; and should there be much exhaustion, it is well to add a teaspoonful of brandy.

11 A.M.—A teacupful of strong soup with a finger of toast, or half a glass of port wine with a small biscuit, will dispel the fatigue apt to follow upon the exertions of the morning toilette.

1–1:30 (this should be the chief meal of the day).—The lighter meats must be chosen; roast or boiled mutton, about four ounces, or a mutton chop or a plain cutlet, may be varied by the occasional introduction into the dietary of a like quantity of fresh minced meat, or the wing of a chicken, or calf's head, or pig's cheek. Green vegetables are usually contra-indicated on account of the flatulence, which they increase, but a little mashed spinach, French beans, cauliflower, or vegetable marrow will often be well borne. This same tendency to flatulence leads such patients to indulge rather freely in mustard, pepper, and other condiments; but great care must be exercised in their use, owing to the risk of gastric catarrh.

Briefly, then, dinner will consist of a slice of roast or of boiled mutton, or a mutton chop, or a slice of pig's cheek or of calf's head, with a spoonful of well-cooked vegetable. Following this may come a few spoonfuls of any plain milk-pudding, seasoned with cloves or cinnamon, or a baked apple with a spoonful of custard.

Beverage.—From a dessert- to a tablespoonful of old spirit in a claret-glassful of water, sipped toward the close of the meal.

5 o'clock.—The afternoon cup of tea will be looked forward to, and need not ordinarily be forbidden, but it must be one cup only, with a slice of toast and butter or of stale bread and butter.

7:30 P.M.—Dinner may consist of an egg lightly boiled or poached, on toast, or a little bit of fresh white fish, such as sole, whiting, or plaice; or tripe in white sauce with bread; also sweetbread, simply cooked (not braised), makes a pleasant variety (Recipes 48–51).

Beverage.—A tablespoonful of old spirit in a little water, as at the midday meal.

A full evening meal always leads to trouble in these cases, causing discomfort, and even distress, with difficulty of breathing in the night; hence the necessity of the small and early supper. It will, however, often conduce to the patient's comfort, and aid his sleeping, if he takes a teacupful of corn flour, or of arrowroot, or of one of the prepared farinaceous foods, with a tablespoonful of brandy stirred into it, just before settling for the night; or a little milk warmed, and with the same amount of brandy in it, may be sipped at that time.

Advanced Stage.—When cases of chronic heart disease come before us in an advanced stage, the question of their dietary is a serious one, but still great help and much relief may often be given, even to such patients, by dieting only.

Dropsy.—The difficulty of breathing may be distressing, the loading of lung, liver, and other organs troublesome, dropsy may have supervened, and yet under a suitable dietary these symptoms may be greatly relieved. The patients will tell us how much difficulty they have in digesting any food, how great their discomfort from flatulence is, and that thirst continually troubles them.

Gastric Catarrh.—It may be that gastric catarrh is mani-

festly present, and this will add to the difficulty of our task. On questioning the patients as to the quantity of liquid taken within the twenty-four hours we find, as a rule, that they are consuming much more than in health, and that at the same time a small quantity of urine is passed; the skin is inactive, and the bowels sluggish. Little wonder, then, that the lungs and the abdominal organs are all congested, and that the anasarca is increasing.

Purgatives and Diuretics.—Purgatives, producing watery evacuations, and diuretics, largely increasing the flow of urine, are most valuable in getting rid of a proportion of the fluid; but if the quantity of liquid ingested be not lessened, the strain on the excretory organ is enormous.

Value of a Dry Diet.—Hence the value of a dry diet in these cases. If the circumstances are explained, so far as possible, to the patient, and his co-operation secured, it is wonderful how quickly he gets accustomed to the limitation put upon his supply of liquid. Thirst becomes gradually less trying, and the feeling of relief arising from the subsidence of the urgent symptoms gives him courage to persevere. Light, nourishing food, in small quantities and not too liquid forms, at frequent intervals, must here be the rule. There is great need for keeping up the patient's strength, but he cannot digest much at one time. A full meal, if retained by the catarrhal stomach, would only lie like a weight upon him, increasing flatulence and embarrassing the heart's action.

Dietary.—It will be difficult to dispense with the morning cup of tea, so refreshing to the patient after a night of somewhat broken rest; therefore at

8 A.M.—Let the first meal consist of a small cup of tea with milk in it, and a slice of dry toast and butter. Here, again, the egg beaten up, with from one to two teaspoonfuls of brandy in the tea, will be the most supporting and easiest-taken form of nourishment. Variations on this meal will be a cupful of bread and milk, or a cup of cocoa with toast soaked in it, and the directions for taking it slowly by teaspoonfuls hold good here equally as in the case of ordinary dyspeptics.

10:30 A.M.—A teacupful of good soup or strong beef-tea, thickened with some farinaceous material, sago or vermicelli, or with fingers of toast dipped in it. The nutritive value and ease of assimilation will be increased by the addition of pep-

tones of beef. In cases of great prostration, from one to two teaspoonfuls of brandy may have to be given with this supply of food.

1:30 P.M.—A plain *purée* of meat or panada of chicken, or pounded meat, with bread crumbs and rice (the cooked meat not to exceed three ounces in weight). From one to two tablespoonfuls of brandy will be allowed with this meal.

4:30 P.M.—A teacupful of shortly infused tea or of cocoa, with a slice of thin bread and butter, or toast, or rusks.

6:30 P.M.—A lightly cooked egg, a teacupful of beef-jelly or of turtle-soup, flavored with a dessertspoonful of old madeira, or a slice of tripe, or an ox palate, with bread. Two tablespoonfuls of brandy must be repeated at this meal.

9 o'clock.—An egg beaten up in a little milk, and brandy to the amount of one tablespoonful; or two teaspoonfuls of Brand's essence of meat, with the like quantity of brandy. This may be repeated during the night, or a little warm milk, with a dessertspoonful of brandy, may be given.

Aortic Aneurism.

A sufficient number of cases of aortic aneurism in which improvement has followed treatment by rest and diet have been reported to render it incumbent on every one placed in charge of such a patient to give this treatment a fair and exhaustive trial.

We must not run away with the notion that it is simply a question of reducing the diet to the smallest amount of food upon which life can be supported. The patient must not be starved, or else, while the aneurism is being cured, he will be killed. What has been termed the "*vita minima*" plan has not succeeded, and has probably done more harm than good. If we consider for a moment the importance of not impoverishing the blood too greatly, we shall see that this must be so. Impoverished blood will lead only to anæmia and dropsy, and will thus defeat the very object we have in view, viz., the deposition of fibrin from the blood within the sac of the aneurism.

Points of the Diet.—The chief points to be borne in mind are these: (1) The diet must be as dry a one as possible; (2) it must be largely nitrogenous; and (3) it must be so distributed

over the day as to minimize the risk of even temporary plethora. To meet the first conditions, we reduce the quantity of liquid given in the twenty-four hours as far as can be borne by the patient. To make the diet supporting, and with a view of aiding the coagulation of the blood within the sac of the aneurism, we make the proportion of nitrogenous food greater than we should consider in other circumstances requisite to balance the dietary. Any approach to acceleration of the circulation being most undesirable, food will be given in small quantities at a time, and nothing like a full meal allowed. Except in cases where there is much prostration, alcohol should not enter into the dietary. In cases of great prostration we must, however, allow a very limited amount, and the safest form will be 2 oz. of claret or of a light burgundy with the food once or twice a day.

The patient must assume a horizontal posture, and be willing to remain at perfect rest in that position for a period of from two to three months. The directions then would be the following:

Breakfast.—An egg or 2 oz. of fish; 2 oz. of bread and butter; 3 oz. of cocoa or of milk.

Dinner.—Two oz. of meat; 2 oz. of potato or bread, or dry boiled rice; 3 oz. of water.

Tea.—One oz. of bread and butter; 2 oz. of cocoa or milk.

Supper.—One egg; 1 oz. of bread and butter; 2 oz. of milk.

Total, say, 12 oz. of solids, 10 oz. of liquids.

Mr. Tufnell's Plan.—The plan proposed by Mr. Tufnell, and which bears his name, directed that the patient should be kept in bed and at perfect rest in the horizontal posture for a period of from eight to thirteen weeks, according to the effect produced upon the aneurism, every care being taken to avoid movement in bed, special arrangements being made that the bowels and bladder might be relieved without altering the position of the body. The only medicines used were occasional opiates and laxatives. The following was the diet prescribed:

Breakfast.—Two oz. of white bread and butter; 2 oz. of cocoa or milk.

Dinner.—Three oz. of meat; 3 oz. of potato or bread; and 4 oz. of water or claret.

Supper.—Two oz. of bread and butter, and 2 oz. of milk or tea: giving a total quantity of solids 10 oz., and of liquids 8 oz.

This plan in Mr. Tufnell's hands resulted successfully in ten cases, and, although a rigid one, might be carried out with the co-operation of an intelligent patient and a reliable nurse. In many cases, however, it will be found necessary to modify it to the extent allowed in the former dietary.

CHAPTER XIV.

ACUTE AND CHRONIC RHEUMATISM.

Acute Rheumatism (Rheumatic Fever).

With some important modifications, to be afterward emphasized, the diet in acute rheumatism is the same as in other acute febrile conditions, and the dieting of the patient is a very important part of the treatment.

Early Stage.—In the early stages of the disease it is not, as a rule, difficult to restrict the patient to a suitable diet; the difficulty rather may be to get enough nourishment taken; but with the return of appetite during convalescence it is hard for him to believe that a good supply of butcher's meat will not make his progress toward recovery more rapid.

Diet must be Non-Nitrogenous.—As a matter of fact, however, we know that a return to solid food, and more especially the giving of meat too soon, is almost certain to be followed by a relapse. In acute rheumatism, more than in most other diseases, the system is loaded with waste products, the results of imperfect assimilation, and the powers of the digestive organs are very seriously impaired.

Milk with an Alkali.—So long, therefore, as the symptoms are acute, small quantities of milk with an alkali, or with an alkaline water, such as potash-, soda-, vichy-, or lime-water, should form the main part of the dietary, and besides these a little beef-tea, or chicken-tea, or mutton-broth only may be allowed. The quantity to be given at a time is a very important matter, for it must not be forgotten that any considerable amount of even liquid nourishment may materially affect the heart's action in the then usually embarrassed condition of that organ. Two to three ounces every hour, or every two hours, are better than double that quantity at longer intervals.

Relief of Thirst.—Thirst may be relieved by sips of an aërated water, and the addition of a little lemon-juice makes

it more palatable, and does not seem to be contra-indicated. If there be diarrhœa, lime-water with the milk is useful.

Farinaceous Substances.—As the temperature falls and the acute symptoms subside, vegetable soups (Recipe 41, 41A), bread, and other farinaceous substances may be gradually added to the dietary; also gruels, milk-puddings, malted foods, arrowroot, corn flour, rice, and the yolk of an egg beaten up with a little milk and a spoonful of brandy. As convalescence proceeds, next will come fresh white fish boiled, sweetbread, or chicken once a day, and the patient should be kept to these things until some days after all rheumatic symptoms have entirely disappeared. Relapses cannot uncommonly be traced to an unwise haste in returning to ordinary diet. It need hardly here be pointed out that any chill, besides risking a return of the inflammatory symptoms, is dangerous, inasmuch as it seriously interferes with the nutritive processes, and thus materially retards convalescence.

Alcohol.—As regards alcohol, it may be said that it is required in most cases of acute rheumatism, indeed in all but those slight cases where the symptoms are neither severe nor long continued. Feebleness or inequality of the pulse, even without irregularity, is an early indication for ordering alcohol; and, if attended to, the more serious prostration and tremulousness of muscles that often follow may be averted. The quantity, however, should be strictly regulated, and the effect upon the heart's action carefully observed. It is best to begin with a small allowance, say two ounces of brandy in the twenty-four hours, given in divided doses of a teaspoonful, a dessertspoonful, or a tablespoonful, according to the age of the patient. In cases of marked cardiac failure, alcohol must be given liberally in larger doses, repeated as often as may seem necessary. The total amount ranges as high in some severe cases as twelve, eighteen, or even twenty ounces in the twenty-four hours.

Chronic Rheumatism and Rheumatoid Arthritis.

The diet must be liberal and most nutritious, but at the same time it must be light, and the digestive organs should not be burdened with any excess. While, therefore, food must be adapted to the circumstances and digestive powers of each

individual patient, the dietary should contain as much fat and fatty matters as possible. All rich and complicated dishes should be avoided, and also all cured meats, dried fish, pies, pastry, and sweets should be omitted from the patient's list.

He may eat at—

Breakfast.—Fat bacon or fat ham, brown bread and butter, and have a cup of cocoa and milk.

Luncheon.—Fresh fish with melted butter, or chicken, tripe, or calf's head, mashed potato, and well-boiled green vegetables.

Afternoon Tea.—A cup of tea or of cocoa with milk, and a slice of thin bread and butter.

Dinner.—If fish has been taken at luncheon, any plain meat, once cooked, may be taken at dinner with a little mashed or grated potato and some well-boiled green vegetable. Any plain pudding or cream, or stewed fruit and cream.

Alcohol.—A small allowance of alcohol is usually beneficial, and the most suitable form for these patients is two tablespoonfuls of spirit in plain or in effervescing water.

Cod-Liver Oil.—Cod-liver oil, malt extracts, or a combination of the two, cream, or so-called cream of malt are useful adjuncts to the dietary.

When sufficient nourishment is not taken at the regular meal times the dietary may be usefully supplemented by giving a cupful of prepared farinaceous food at bedtime or during the night. Old people frequently require the latter.

CHAPTER XV.

ALCOHOLISM.

Chronic Alcoholism.

The furred tongue and ethery breath, the watery eye and shaky hand, of the man who habitually indulges too freely in alcoholic stimulants tell their own tale, and hardly need the history of disturbed sleep and other nervous distresses, or of morning sickness and different gastric disturbances, to confirm the diagnosis.

In all cases of chronic alcoholism the digestive powers are more or less weakened, the nervous and muscular systems enfeebled, and the nutritive functions impaired.

Dietary.—(*a*) In Severe Cases.—When severe cases of long standing come under our observation, marked alterations in the structure of the viscera have already taken place. Fatty degeneration and fibroid contraction are the characteristic changes met with in the different organs. In the stomach chronic gastric catarrh, with fibroid degeneration and atrophy of secretive glands, is prominent. Fatty degeneration of the heart and blood-vessels results in feebleness of the circulation and a marked tendency to local congestions; similar changes in the liver and kidneys, advancing to cirrhosis, seriously interfere with the functions of these important organs. Nor is the nervous system exempt from changes of a like kind. The tissues of the whole body are pale, flabby, and fatty or fibroid; the functions of the different organs are not actively performed, and in these circumstances absorption and assimilation, on the one hand, are very imperfect, while, on the other hand, the elimination of waste products is much hampered. Nutrition, therefore, is almost at a standstill. These patients require nourishment in considerable amount, but they have no appetite for food, and, as we have already seen, their digestive powers are but feeble. They consume only a small amount

of food, and they are not able fully to digest what they do take.

Conditions of Recovery.—The conditions necessary to their restoration to health are, first, to leave off alcoholic stimulants altogether; and, second, to take as much simple nourishment in regulated quantities as we find they can digest. The diet, therefore, must be adapted, as far as it is possible to do so, to the degree of structural change that has taken place. The more advanced the condition, the more simple the diet. Food of the simplest kinds must be given in small quantities at short intervals. Remembering that the early morning is the worst time with such patients, that then they feel depressed and good for nothing, an early light breakfast should be given them in bed.

Breakfast (say, 8 o'clock).—A cup of weak tea with an egg beaten up in it, and a slice of toast, or a cupful of revalenta arabica (Du Barry's).

Second meal, 10:30.—A cupful of good meat soup, thickened, or a cup of peptonized milk, warmed (Recipe 74), with toast or rusk.

Early dinner, 1 o'clock.—A tablespoonful of pounded meat on toast, or a small teacupful of fresh meat juice, with fingers of toast. A couple of spoonfuls of sago, custard, or tapioca pudding. Beverage.—Half a tumblerful of milk and soda-water (equal parts).

Afternoon tea, 4:30.—A cup of weak tea or of cocoa nibs, with rusk or a plain biscuit.

Evening meal, 7 o'clock.—A cup of soup or of mutton-broth, as at the forenoon meal.

9:30 or 10.—A cup of peptonized milk and a slice of thin bread and butter.

Food during the night.—In case of wakefulness there should be within reach, and arranged so as to be readily warmed, peptonized milk. The ordinary Etna or spirit lamp will be convenient for this purpose.

(*b*) Slighter Cases.—In slighter cases we may have only the characteristic mawkish breath and the muscular tremors, or other commencing nervous symptoms, indicating the patient's danger and the necessity for reforming his mode of life; and, in these milder degrees of the condition, if we succeed in inducing him to leave off every form of alcoholic stimulant, and to take

plenty of plain, simple food, rapid restoration to health may be anticipated. We should diet such a patient in the following manner:

Breakfast.—A lightly boiled egg, or a little bit of white fish or of bacon, or a light, savory omelette; toast, or bread and butter; a cup of weak tea or of coffee and milk.

Early dinner, 1 o'clock.—A slice of roast mutton, or the wing of a chicken, or a plain cutlet, with a spoonful of mashed potato and some well-boiled green vegetable. A few spoonfuls of any plain milk or bread pudding, with occasionally some stewed fruit. Beverage.—A glass of plain or aërated water, to be taken slowly toward the close of the meal.

Afternoon.—A cup of tea with milk may be allowed, with toast or rusk.

Supper, 7:30.—A light meal of fresh fish, or of bird, or of calf's head, or of tripe, with dry boiled rice or bread. Beverage.—Small glass of milk and soda-water.

Acute Alcoholism (Delirium Tremens).

Anorexia is always a prominent symptom in cases of acute alcoholism, especially at the beginning of the attack. If the subject of acute alcoholism has been a chronic drinker, and the pathological changes briefly enumerated under the head of Chronic Alcoholism have been established, his powers of digestion are so enfeebled that alimentation becomes a matter of extreme difficulty. The condition may, however, arise occasionally in more healthy subjects who have not been habitual drinkers, and whose constitutions, therefore, are not so far gone as in the case of those who are saturated with alcohol. In both classes the question of alimentation is of vital importance, but in the latter it will probably be managed far more easily and successfully than in the former. In the latter, moreover, there is no fear of evil results following upon the omission of alcohol in every form from the dietary. As soon as the patient can be induced to take a good supply of nourishing food, the depths of his depression have probably been reached, and there is every hope of his soon obtaining refreshing sleep. In beginning the treatment, small quantities of food must be given at intervals of two hours, or oftener, if the quantity taken at a time be very small and the patient extremely restless.

Dietary.—A cupful of good soup, mutton-broth, or chicken-tea, thickened, should alternate every two hours with a cupful of milk, plain or peptonized.

An egg beaten up in weak tea with milk may take the place of one or two of the supplies of plain milk, say in the morning and evening.

As natural sleep returns, and the patient's general condition improves, the stomach will become able to deal with larger supplies; therefore increase the amount by one-half, and add to each supply some farinaceous material. Increase also the interval to three hours, not awaking the patient to take food, but getting in the supplies between his sleeps. As convalescence becomes established the following diet will be well borne:

Early breakfast in bed.—A cup of tea or of milk with an egg beaten up in it, a slice of toast or butter; on alternate days a cup of cocoa with bread and butter.

In the middle of the forenoon.—A cup of good meat soup (Recipes 1–10 and 40), with toast, or a cup of warm milk and a biscuit.

Early dinner, 1:30.—A small basin of plain *purée* of meat with bread, or a panada of chicken with a little mashed potato, followed by a simple milk-pudding (Recipes 57–64). Beverage.—A small glass of home-made lemonade or of milk and soda-water.

For afternoon tea.—A cup of cocoa or of tea with plenty of milk, with a slice of bread and butter or a plain sponge-cake.

Supper, 7:30.—Fish, or sweetbread, or tripe, or a few oysters, with brown bread and butter. Beverage.—A glass of milk and soda-water.

In the latter stage of convalescence the same diet as directed for the slighter forms of chronic alcoholism will be found suitable (p. 649).

Exclusion of Alcohol from the Dietary.—The advisability of excluding every form of alcohol from the dietary of patients suffering from delirium tremens is by some called in question, but it may safely be asserted that in the great majority of uncomplicated cases no harm follows the practice of cutting off alcoholic stimulants altogether. Where, however, there is great feebleness of constitution, especially in old people or

where some complication, such as pneumonia, sets in, the case is altered, and it may then be absolutely necessary to give some form of alcohol to prevent the patient from sinking. Spirits should even then be avoided, and, if the patient can take it, some form of malt liquor given with food. In cases, too, where prolonged sleeplessness has become a source of anxiety to the medical attendant, it may be found necessary to give stout or other malt liquor if sedatives by themsleves have failed to produce sleep.

Nutrient Enemata.—In all cases where sufficient nourishment cannot be taken by the mouth, or where the patients fight against their food, nutrient enemata should be freely given.

CHAPTER XVI.

NERVOUS DISORDERS.

Hysteria.

The question of diet is one that should bulk very largely in the treatment of all hysterical patients. The food question is a constantly recurring difficulty, and one that in some form or other meets the physician at every turn. Careful inquiry will usually prove that a sufficiency of food is not being taken, or that the diet is sadly deficient in some important particulars. Some hysterical patients like to pose as interesting invalids, who can eat next to nothing; others have so many likes and dislikes—the dislikes greatly preponderating—that the least digestible, least nourishing, and altogether most unsuitable articles of diet are the only things taken. In both classes a state of semi-starvation is kept up. The nervous system, already disordered and requiring to be well nourished, is alternately excited and depressed by the unwholesome supplies of food and drink; morbid ideas increase, and a vicious circle is established by these factors acting and reacting on each other. The result is indigestion more or less constantly present.

Gradual Increase of Food.—It is useless in such circumstances to attempt to remedy this condition of affairs by putting the patient suddenly onto a full diet. We must begin by interdicting the improper foods. All stimulants must, save in exceptional cases, be absolutely forbidden; also strong tea and coffee. A dietary consisting largely of meat, to the exclusion of farinaceous substances, green vegetables, and fruit, is often indulged in by such patients, although it is not well adapted to their actual wants. What they do require is food in such forms as will readily supply nourishment to their disordered nervous systems—not an unlimited supply of nitrogenous material, for that would further tax their already

weakened digestive organs. Eggs, fish, fat meats, butter, cream, milk, puddings made with milk, fresh vegetables, and cooked fruit should enter largely into the dietary we prescribe.

Small Meals.—Large quantities of food at a time are not well borne; hence four or five small meals will be the order of the day.

Breakfast.—A saucerful of porridge (well-boiled oatmeal, wheat meal, or hominy), with cream, followed by a frizzle of fat bacon or an egg, and a slice of bread and butter, will form an excellent breakfast. In the middle of the forenoon a cup of milk with a biscuit.

Luncheon, at 1:30 or 2 o'clock.—A plain meal, two courses —fish or meat, and pudding; thus, a slice from the joint, a spoonful of mashed potato, and some well-boiled green vegetable. A milk-pudding or plain shape, with stewed fruit.

Beverage.—Half a tumblerful of cold water. In the afternoon a cup of weak tea, with milk, or a cup of cocoa and a slice of toast or of bread and butter.

Supper, at 7 or 7:30.—A light supper, consisting of an egg or fresh white fish, chicken, sweetbread, or the like, with bread and butter, and half a glass of water. Before going to bed a teacupful of milk (with the chill taken off) and a biscuit or slice of bread and butter.

If the patient wakes early in the morning, she should have within reach some milk, easily warmed by means of an Etna or other form of spirit lamp; and in any case some light food, such as a cup of cocoa or of warm milk, should be taken in the morning before dressing. Without this precaution the patient is too much exhausted after the bath and the fatigue of dressing to have any appetite for breakfast. With returning strength and the ability to take larger quantities of food at regular meal times, the intermediate supplies of the forenoon and evening may be gradually diminished and dispensed with.

Alcohol.—Allusion has already been made to the importance of excluding, in these cases, from the dietary alcohol in every form. It must be granted, however, that where the digestive functions have for a long time been seriously impaired, and there is much consequent weakness, a limited amount of alcohol will be necessary.

Light wine.—The form in which it is least objectionable is

that of a light wine, and the patient may be allowed to take with the midday meal and with supper a glass of claret, of light burgundy, of hock, or of chablis. Experience proves that patients of this class who are able to spend a considerable portion of time in the open air, and to take a reasonable amount of exercise, do better on an entirely non-alcoholic diet.

Slighter Cases.—In cases where things have not gone to extremes, where friends and attendants have not altogether lost control of the patient, judicious managment, together with properly regulated exercise and a diet such as that sketched above, will often work wonders in the treatment of hysterical patients.

"*Weir-Mitchell*" *Treatment.*—When, however, there is great emaciation and serious depression of nerve power, it is to what is generally known as the Weir-Mitchell plan of treatment that we now turn in the hope of benefiting these patients. The combined nature of this treatment must not be forgotten —rest, isolation, massage, large quantities of food, and electricity. Without strict isolation and complete rest, little good will be obtained, and, without massage properly carried out, the large quantities of food cannot be digested or assimilated.

Isolation.—By separation from friends and ordinary surroundings, old and often hurtful associations are broken up, and the worried nervous system is put at complete rest.

Massage.—The massage, with or without electricity, takes the place of exercise, and the amount can be regulated from time to time as the physician finds necessary to suit the requirements of the particular case. By means of systematic massage the elimination of waste products is greatly stimulated, and a steady building up of healthy tissue takes place, the ultimate result being a vast increase in both muscular and nerve power.

Selection of a nurse.—The first important conditions of success are the selection of a suitable and reliable nurse, and of a bright, airy room with a good exposure. These are matters of the greatest importance, when it is considered that the patient must remain in bed absolutely for at least three or four weeks from the beginning of the treatment, and that all communications with the outer world are practically cut off.

Before commencing treatment, the patient's weight should be ascertained, and may be taken at intervals during the course.

Milk alone at first.—At first the food given should be milk alone, with the exception, perhaps, of a small cup of black coffee early in the morning, if required, to obviate a tendency to constipation. The milk will generally agree best if it be slightly warmed, but unless there be diarrhœa it need not be boiled. For the first day or two, give every two hours from three to four ounces of milk, which will bring the total quantity in the twenty-four hours to about two pints, allowing for the intervals of sleep.

Amount of milk.—The amount given at a time should be gradually increased, and the interval lengthened to three hours, the total being brought up to two quarts. The milk should be sipped very slowly, and, if it be very distasteful to the patient, as is the case in rare instances, it will be necessary to add enough tea, coffee, or cocoa just to flavor it. In other cases where milk is at first badly borne, though happily these also are rare, the difficulty may be got over by giving milk with a lessened amount of ordinary food, and gradually increasing the quantity of milk until it becomes the sole diet.

Alkalies with milk.—Alkalies with milk will be needed only in those cases where it sets up much acidity. After two or three days alternate supplies of five and ten ounces every three hours will usually be well borne. Soon ten ounces every three hours can be taken with ease, and we shall next proceed to add for breakfast a cup of cocoa with bread and butter, and in the middle of the day a milk-pudding. Fish or chicken will next be added, first either at the midday or evening meal and then at both. The diet will therefore stand thus:

Milk.—Sixty to eighty ounces.

Breakfast.—Cocoa and bread and butter.

Luncheon.—Fish, vegetable, and pudding.

Dinner.—Chicken, vegetables, and bread.

In most cases, after a few days of this diet further additions may be made as follows, still keeping up the full quantity of milk:

Breakfast.—Porridge and cream early in the morning.

Second breakfast.—Cocoa and egg, bread and butter.

Luncheon.—Fish, bread, pudding and milk; or chicken, vegetables, and pudding.

Dinner.—Mutton or beef, two or three kinds of vegetables, milk-pudding, or stewed fruit with cream.

Extract of malt may be given with one or more supplies of milk during the day, and, if strong soup and beef peptonoids are used, they will take the place of one of the supplies of milk.

Cod-liver oil and iron are useful adjuncts in some cases; and other tonics, as acids, quinine, and strychnia, given toward the close of the treatment, may be usefully continued for some time afterward.

Gradual reduction of diet.—At the end of five or six weeks the slackening off of this excessive diet is commenced by reducing the quantity of milk, and, as the patient comes to take more exercise, the massage also is lessened.

Increase in weight and muscular power are the best tests of the efficiency of the massage. If the result be not satisfactory in these two important respects, it is high time to inquire closely into the way in which the massage is being carried out.

After-treatment.—When the term of treatment is concluded, the patient should lead an active open-air life, but for some months longer a daily rest of two or three hours should be inculcated. The return to ordinary diet must be made gradually, by leaving off the intermediate supplies of food one by one. In this way the system by degrees adapts itself to the change. A sea voyage or a prolonged tour in many cases confirms the cure. Relapses, happily, are uncommon, especially where this treatment is followed by a life of active usefulness.

CHAPTER XIII.

DIATHETIC DISEASES.

Fevers (except Typhoid Fever, see p. 661)—Acute Pneumonia, etc.

The teaching of Graves marks a revolution in the dietetic treatment of fevers. A great reaction then set in against starving in acute diseases accompanied by fever, and since that time the danger has been more on the side of over-feeding than of under-feeding.

Precise Directions.—Unless precise directions are given by the physician, anxious friends, and even nurses, who should know better, are apt to push the quantity of food too far, thereby oftentimes adding to the discomfort to the patient, if they do not actually endanger his life or retard his recovery.

A very prevalent idea is that if the patient be restricted to beef-tea, broths, and milk, these foods may be given practically without limitation, to make up for increased metabolism and loss of nitrogenous material consequent on the feverish state. Undoubtedly the difficulty in not a few cases is to get the patient to take a sufficiency of nourishment; but, on the other hand, the unlimited administration of food in cases where the patient will take it is as reprehensible as the plan of starvation.

Several general points should here be noted in regard to the febrile state and the feeding of patients during the course of acute febrile diseases.

Impairment of Digestion.—In the first place, we find that the functional activity of the digestive organs is seriously impaired from an early period of the febrile attack. Sir William Roberts has stated forcibly ("Dietetics and Dyspepsia," p. 67) the distinction between gastric and intestinal digestion, pointing out that in persons who are seriously ill the stomach is inactive, and the secretion of gastric juice so greatly dimin-

ished as hardly to be taken into account in fixing the diet. He believes that in severe cases the stomach loses its normal office, and becomes merely a continuation, as it were, of the œsophagus to carry on the liquid food to the duodenum. He remarks that this loss of gastric activity accounts for the fact that many persons who in health cannot digest milk are able to do so with ease during illness. There is not enough gastric juice to curdle the milk, so it passes on into the bowel unchanged, and is there readily acted upon by the pancreatic secretion.

Curds in the Stools.—The passage of undigested food and of hard masses of milk curds in the motions is an indication of some error in the dietary that should never be overlooked. When this takes place, food is either being given of such a kind or in such quantity as the enfeebled digestive organs cannot cope with. If the quantity or quality be not at fault, then we should suspect the mode of administration of the food or the circumstances under which it is given. Food that is not digested and assimilated, besides causing discomfort to the patient and producing an increase of fever, may also (as, for example, in typhoid fever) be actually an additional source of danger to life.

Fluid Foods only to be Given.—It follows, therefore, that only the simplest kinds of fluid food should be given, as will be fully pointed out when discussing the articles of the diet.

Secondly, throughout the course of a febrile attack there is greatly increased waste of tissue, proportionate to the rise of temperature and the continuance of the fever. The nitrogenous tissues suffer most, but also, secondarily, fats, as shown by wasting of muscles and by general emaciation.

Limitation of Albuminoids.—The rapid destruction of the nitrogenous tissues also leads to an accumulation of nitrogenous waste materials in the blood; and in all cases where the elimination is to any extent defective, as it is in most fevers, the quantity of albuminoid substances in the diet must be kept down to a small proportion.

It is very doubtful to what extent albuminoid foods can be made use of by the organism during the continuance of fever in the formation of new tissue to replace that lost by increased metamorphosis; but the judicious selection and combination of foods in the dietary may prevent undue waste and afford

the patient sufficient material for organic combustion, or, as it is sometimes called, a sufficiency of "fuel food."

Milk.—The staple food in febrile conditions is undoubtedly milk, but caution is necessary in the use of even milk, for if it be given without care and discrimination, untoward results may follow. As has been already noticed, milk may pass along the intestinal canal, remaining almost in its fluid condition during febrile states; but, on the other hand, if milk be given without due precaution, firm curds will be left undigested, and these, especially in cases where the bowels are inflamed or ulcerated, may do serious mischief.

Diluted Milk.—To prevent excessive curdling of milk, it must be given in small quantities at a time, say from two to six or eight ounces, diluted with lime-water, or with soda, seltzer, or other effervescent water—one part of such water to two of milk. Where it is desirable to limit the bulk, saccharated solution of lime, ♏ xx. to each feederful of milk, may be used, but generally a considerable quantity of fluid is needed to supply the loss of moisture that is taking place in the febrile state, and hence the other methods, namely, by dilution, are to be preferred. If milk is well borne, from two to three pints should be given—four ounces every two hours or six ounces every three hours, which will come to about two and a half pints in the twenty-four hours. The quantities, the hours at which they are given, and the total amount should be accurately put down by the nurse.

Whey.—In cases where milk does not agree well, whey (Recipes 80, 81) may be given as a substitute for milk in part or in whole. Sometimes the milk is taken more easily and readily if we permit certain of the supplies to be flavored with tea, coffee, or cocoa, and there is usually no serious objection to doing so.

Beef-Tea and Broths.—Next to milk, the most important articles of diet in fevers are beef-tea, meat broths, and chicken-tea, and these are much more valuable as foods when they contain some farinaceous substance, such as baked flour or pounded biscuit. Farinaceous substances are required, and are useful by affording fuel food. Arrowroot made very thin, gruel, also thin and carefully strained, are types of this form.

Prepared Foods.—But there is here a large field for the use of prepared foods, of which Mellin's and Benger's may be

taken as typical examples. These foods readily supply the grape-sugar that is more than ever needed to meet the loss occasioned by rapid oxidation during the continuance of high temperatures. Malt extracts are also valuable additions to the dietary.

Thirst.—Usually there is considerable thirst in fevers, and patients take readily of diluent drinks. Even if not asked for, simple drink should be given between the supplies of food, and they may not only be varied, but may have some nutritive value, by the addition of sugar or of malt extracts.

Pure cold water is often the most acceptable drink to the patient, but barley-water or rice-water, and beverages made with the juice of fresh fruits, such as currants (Recipe 20), and lemonade (Recipes 24, 25), are useful alternatives; also the old-fashioned potus imperialis (Recipe 21) and toast-water.

Alcohol in Fevers.—Alcohol is often, but by no means always, a necessary adjunct to the diet in fevers and acute diseases generally. It should not be prescribed in all cases as a matter of course and as a part of the recognized dietary. In acute diseases lasting but a limited time, in an ordinarily healthy person, alcohol is not required at all, or not at least until the convalescing stage, when a little wine may improve the appetite and aid digestion.

Indications for the use of alcohol.—In all cases, however, when any sign of failure of circulation shows itself; in those cases in which severe symptoms and high temperatures appear early in the course of the disease; in persons who have been accustomed to the use of large quantities of stimulants; in the aged, in very young children, and in all persons of feeble constitution, alcohol is required, and should be given freely, if necessary, even from the commencement of the attack. Whenever and wherever we have to face the signs of feeble circulation and of nervous prostration in acute disease, alcohol is necessary. The small, compressible, rapid pulse, the feeble or scarcely audible first sound of the heart, with or without low muttering delirium, are sure indications for the use of alcoholic stimulants.

To get the full good of alcohol, in whatever form it may be used, it should be given with or just after food, and thus too great borrowing of strength is prevented.

Spirits.—During the course of febrile diseases the best

form of alcoholic stimulant is good old spirit, and, as a rule, brandy or whiskey answers best. The quantity will vary with the age and condition of the patient. The minimum, however, may be put at two ounces, and the average at from three to six ounces. In exceptional cases, however, as much as twelve ounces or more may be required.

Wines.—If there be any reason to prefer giving wine rather than spirit, then a good light port, or burgundy, or a champagne may be selected. It is during convalescence, however, as already noticed, that wines are most useful, and the rule as to quantity should be that no more be given than that amount which increases appetite and improves digestion.

Typhoid Fever.

The regulation of the diet in typhoid (enteric) fever forms such an important part of the treatment that it is desirable to consider it by itself, apart from other fevers, and at some length.

Danger of Over-Feeding.—The risk of over-feeding has already been alluded to in speaking of the diet of fevers in general, and it need only here be remarked that the tendency to over-feeding is perhaps greater in typhoid than in other fevers and febrile diseases, while the danger to the patient is likewise greater.

Condition of the Stools.—The chief guide in the matter of food in typhoid fever must be found in the condition of the stools. The physician in charge of the case should himself see the motions daily, and should not take this important matter on the report of even an experienced nurse, since she may easily be misled by appearances. If any signs of undigested food show themselves, there is something regarding the dietary needing to be inquired into, and, if possible, put right.

Milk.—A very common idea is that a typhoid-fever patient cannot take too much milk. This is probably true up to the point to which the milk is fully digested, but no further. It is undigested food, and especially undigested milk in hard curds, that causes the danger in the inflamed and ulcerated state of the bowels. If masses of hard curd appear in the motions, there is some fault in the dietary. Too much milk is being given in the twenty-four hours, or it is being

given in too large quantity at a time; and these points must be looked into and carefully considered.

Alkali with milk.—It may be that the quantities are not wrong, and that dilution of the milk or the addition of an alkali or of some farinaceous material in powder will answer the purpose, by preventing the formation of firm curds, which pass along undigested, and add so greatly to the risk of increased diarrhœa, of hemorrhage, or even of perforation. Remembering the condition of the bowels, it cannot be wondered that the passage of hard masses of curdled milk should cause such discomfort to the patient in the way of flatulence, griping, and diarrhœa, if worse results even do not follow.

If the total quantity of milk given be not too great, and yet it be not fully digested, careful inquiry must be made into the mode of administration of the milk. The quantity given at a time should be restricted, or, if the fault do not lie there, an alkali such as lime-water or soda-water should be added to the milk. Where it is desirable not to increase the bulk too much, and not to give it quite cold, the chill may be taken off by adding a little hot water, while the addition of twenty drops of the saccharated solution of lime in each supply will secure alkalinity.

Farinaceous substances in milk.—Another useful measure is to put some farinaceous substance, such as arrowroot or baked flour, into the milk, to aid the subdivision of the curds. Such a substance as baked flour, containing as it does a proportion of dextrine, forms a considerable addition to the nutritive value of the food.

Precise Directions.—As has been already pointed out, definite directions should be laid down as to the quantity of food to be given at a time, the mode of its administration, the intervals between the supplies, and the total amount for the twenty-four hours. For example, it should not be left to the nurse to give, if she thinks fit, milk and water as an ordinary drink whenever the patient is thirsty. He may, however, be allowed, in the intervals between the supplies of food, to sip freely of plain cold water, or of toast and water, barley-water, lemon-juice in water, or other such simple drinks (Recipes 19, 22, 24, 31, 32).

If milk-sugar or grape-sugar in some form be added, it helps materially in sustaining the patient.

Beef-Tea and Broths.—Hitherto mention has been made of milk only, but beef-tea, properly made (Recipe 3), mutton-broth, chicken-tea thickened with farinaceous substances, may be given in greater or less quantity, according to circumstances. One point that should regulate the amount of meat-broths given is the state of the bowels. If diarrhœa be at all an urgent symptom, then beef-tea and broths are contra-indicated, or should be given in very small quantities. In any case of typhoid fever, meat-broths, if given in large amount, tend to increase diarrhœa. In some cases meat-jelly iced or extracts of meat may take the place of beef-tea and broth, a teaspoonful being given at a time.

Dietaries.—Coming to the details of the diet, in an ordinary case two and a half pints of milk and a pint and a half of beef-tea or of mutton- or chicken-broth will be a fair average supply, given in divided quantities, alternating as far as possible the milk and the broth. In this way, giving ten ounces at a time every three hours, the broth will come in after about every second supply of milk. Where as much as ten ounces cannot be taken comfortably at one time and well digested, we may give from five to seven ounces every two hours.

Sleep.—An important question is whether the patient should or should not be wakened to take nourishment. The judgment of a sensible, observant nurse may in this matter be trusted to a considerable extent, but the patient should certainly not be allowed to miss more than one supply of food; and often less harm will be done by gently interrupting a somewhat restless sleep to give food than by risking the exhaustion consequent upon the patient going too long without nourishment.

Nutrient Enemata.—Nutrient enemata are sometimes required to maintain life and tide over dangerous periods in typhoid fever (for particulars see chapter on Nutrient Enemata). If they are not well retained, from fifteen to twenty-five drops of laudanum should be added to each enema.

When serious hemorrhage occurs, it is necessary to suspend feeding by the mouth altogether for twelve or twenty-four hours, and to give small enemata of prepared and predigested materials, with or without stimulants according to the condition of the patient. If he is very weak and collapsed,

a moderate amount of alcohol must be given, but not more than is absolutely necessary, lest by this means the tendency to hemorrhage be increased.

Alcohol.—Next to the consideration of the food comes the question of alcoholic stimulants in cases of typhoid fever.

A considerable number of cases can no doubt be treated successfully without the use of alcohol in any form, and it may almost be said that it is never required in the early stages of the disease. The exceptions to this rule are patients in a very debilitated state, and those who have previously been accustomed to imbibe freely; also cases in which very high temperatures and other serious symptoms come on suddenly at an early period. In such cases it is necessary to give alcohol without delay, perhaps even from the beginning; but in ordinary cases it should never be ordered as a matter of course or without due consideration of the circumstances of the individual patient.

Indications for the Use of Alcohol.—Our chief guide to the use of alcohol in typhoid fever lies in the condition of the heart. A small, frequent, easily compressed pulse, especially if associated with feebleness of the first sound of the heart, is a clear indication that alcohol is required. If under its use the pulse becomes steady, fuller, less frequent, and less easily compressed, the alcohol is doing good. When along with this improvement of circulation there is lowering of the temperature and less delirium, there remains no doubt as to its beneficial effect.

Quantity of alcohol to be given.—The amount given at a time should be small—from a teaspoonful to a tablespoonful of spirit or an ounce of wine three or four times a day. The stimulant should be given in the food or just after it, and the effect must be carefully watched.

If required, the quantity given in twenty-four hours may be increased up to eight or ten ounces, in divided doses of half an ounce or an ounce each. In cases of extreme weakness, an ounce of spirit every hour will not be too much; and it is astonishing how well patients who in health are unaccustomed to the use of stimulants bear so large a quantity of alcohol. Good old port or madeira answers well; but, on the whole, preference is to be given to mature spirit in the form of old brandy or whiskey.

In cases where the cold bath or cold sponging has to be resorted to, it is desirable, as a rule, to give from two teaspoonfuls to a tablespoonful of spirit in a little water just before commencing or during the process.

Diet in Convalescence.—During convalescence the regulation of the diet is of the utmost importance. The condition of the bowel demands the greatest care on our part that the tender healing or newly healed surfaces be not injured by any hard or indigestible substance. The worst consequences have followed very slight negligence in this respect, and therefore for a considerable time the greatest caution is necessary. It is a safe rule to follow that no solid food be given until the temperature has been normal for at least eight days, and in irregular and severe cases a longer period should elapse. Even then it is not uncommon to have a slight rise of temperature, with some constitutional disturbance, on the first return to really solid food.

The first step should be to increase the thickness of the beef-tea or soup with fine bread-crumb. Next, lightly made farinaceous puddings may be given, also custards and jellies. Later on, beaten-up eggs and slightly boiled and poached eggs may be allowed, and also finely pounded meat. As a further step, tiny sandwiches made of pounded chicken or pheasant between thin squares of bread will often be greatly relished by the patient. The way for red meats should be prepared by the giving of a slice from the breast of a chicken, with a little bread-sauce. Oysters also form an agreeable change. White fish is useful and allowable early; but the danger of bones being left in it, even by the most painstaking cook, makes us chary of its use.

Fruits.—Fruit is contra-indicated throughout the course of typhoid fever, on account of the risk there always is that it will increase diarrhœa, but in the convalescent stages a few grapes may be allowed, provided that the skins and pips are removed and not swallowed. The pulp of a ripe orange may be admitted, under similar stringent conditions.

If the patient has been taking any considerable quantity of alcohol during the acute stages of the disease, the amount may be gradually lessened during convalescence, and the form of the stimulant changed to light wines given with the food. Green vegetables and fruits other than those men-

tioned above must be avoided for a considerable time, and the return to ordinary habits of diet and of life must be made very carefully and very gradually.

Note.—It is best to have separate feeding cups for food and medicines. If the same cup be used, or even one that is similar in appearance, the association of ideas is against the taking of food.

Cleansing of the Mouth.—It is hardly necessary to remark here that frequent cleansing of the mouth tends to make the taking of food easier. When the mouth is allowed to become dry and foul, this condition is a serious obstacle to the taking of nourishment.

CHAPTER XVIII.

DISEASES OF CHILDREN.

Indigestion in Infants and in Older Children.

Healthy Milk—In Infants.—If the child is being brought up by hand, great care must be taken, if symptoms of indigestion appear, to see that the cow's milk is perfectly healthy. If no fault is to be found with the milk, all that may be needed is for a time to dilute the milk with a larger proportion of water than usual. The diet mentioned in the section on Diarrhœa will also often agree well in such cases, or cream diluted with four or five times as much water, or the following diet, recommended by Drs. Meigs and Pepper for weakly children, consisting of prepared gelatin or isinglass, cow's milk, cream, and a very thin arrowroot-water with sugar (p. 671). They advise, as an alternative to this diet, one composed of thin arrowroot-water, lime-water, cream, and milk in equal proportions; the quantity given at first to be not more than four tablespoonfuls every two hours. After a day or two, if the food is well borne, six tablespoonfuls are to be given every two hours, and this again increased to eight tablespoonfuls. As the gastric disturbance subsides, the quantities of cream and lime-water are to be lessened, and the amount of milk increased, thus bringing the child gradually back to its ordinary diet. During acute attacks the child should be allowed to drink freely, in the intervals between the supplies of food, of fresh cold water. When there is great prostration, the water should contain brandy, in the proportion of two teaspoonfuls to the pint.

Indigestion without Diarrhœa.—When no diarrhœa is present, weak mutton- or chicken-broths will often suit when other things fail. Strict regularity in the times of giving the food, and careful regulation of the quantities given at one time, are of the utmost importance.

In Older Children.—Restriction of the diet to bread and milk, milk-puddings, bread and butter, broths thickened with some farinaceous substance, such as baked flour, rice, or crumbled toast, pounded chicken, rabbit, or very tender mutton pounded, with little or no vegetable for the time being, and the exclusion of all sweets, cakes, and fruits, will answer best, and that often without the aid of drugs.

Dietary.—In detail such a diet will be:

Breakfast.—Very well-boiled whole meal or oatmeal porridge with milk, or bread and milk, or cocoa and bread and butter.

Dinner.—Chicken or tender mutton (pounded, if necessary), with bread and a little dry boiled rice, or broth thickened, followed by a little milky pudding.

Tea.—Warmed milk, or milk and hot water, or cocoa, with bread and butter.

Supper.—A little milk and a plain biscuit.

Children should be made to eat very slowly, and to masticate food very thoroughly.

Chronic Diarrhœa.

The food composed of arrowroot, cow's milk, and cream with gelatin is an exceedingly useful one.

Dr. Eustace Smith recommends, for a child one year old, who can digest a certain quantity of milk, and in whom diarrhœa is not very severe, a teaspoonful of Liebig's food for infants every three hours, dissolved alternately in equal parts of milk and water, and in equal parts of weak veal-broth and barley-water.

If the child can digest no milk, he advises the following diet:

7 A.M.—One teaspoonful of Mellin's food dissolved in a teacupful of veal-broth and barley-water, equal parts.

11 A.M.—One tablespoonful of cream in a teacupful of fresh whey.

2 o'clock.—The unboiled yolk of one egg beaten up with fifteen drops of brandy, a tablespoonful of cinnamon-water, and a little white sugar.

5 P.M.—Six ounces of beef-tea (1 lb. to the pint).

11 P.M.—A meal similar to the one at 7 A.M.

As the child's condition improves, a little milk can be gradually added to the diet.

Rickets.

While different theories regarding the pathology of rickets may be maintained, authorities on the subject are agreed as to the causation of the disease.

Causes.—Defective nutrition of children is without doubt the usual cause of rickets, and the dyspepsias and gastro-intestinal catarrhs due to improper feeding greatly favor the occurrence of the disease. Added to unsuitable diet there are usually, though by no means invariably, to be found bad hygienic conditions—a low damp situation, bad ventilation, deficiency of exercise in the open air, and want of cleanliness.

"Rickets, although one of the most preventible of children's diseases, is one of the most common. It begins insidiously, presenting at first merely the ordinary symptoms of defective assimilation, and attention is often not attracted to it until the characteristic changes occur in the bones which place the existence of the disease beyond a doubt. It is the result of malnutrition; any disease, therefore, which seriously interferes with the assimilative power, and causes sufficient impairment of the general strength, may be followed directly by the disorder under consideration, without any intervening stage. Reduce the strength to a given point, and rickets begins. Prolong this state of debility sufficiently, and the characteristic changes resulting from the disease manifest themselves. Any case, therefore, which will reduce the strength to this point lays the foundation of rickets. . . .

"Rickets is usually ranked among the diathetic diseases of childhood, but its claims to such a position are by no means indisputable. In rickets there is, strictly speaking, no constitutional predisposition; it is the result of certain known causes, without which the disease cannot be produced. That the disease occurs among the children of the rich as well as among the poor is no argument against this view; for wealth cannot buy judgment, and education is no guarantee against foolish indulgence. We know that a child may be in reality starving, although fed every day upon the richest food, for he is nourished, not in proportion to the nutritive properties of the food he swallows, but in proportion to his capability of

digesting what is given to him. . . . Rickets does not produce malnutrition; malnutrition produces rickets. . . .

"Rickets, then, is not a diathetic disease in the sense in which tuberculosis and syphilis are diathetic diseases. It is acquired under the influence of certain causes, lasts as long as these causes continue in operation, and, unless the structural changes are so extensive and the general strength so reduced as to forbid recovery, passes off when the causes are removed."—*Eustace Smith.*

Allusion has already been made to the part that bad hygienic surroundings take in the causation of this disease, and acute diseases which rapidly exhaust the strength of the child and lower his powers of assimilation should not be omitted from the list of common causes.

Health of the Mother.—If the mother herself be in feeble health while she is suckling her child, her milk will not be sufficiently nourishing, and the sooner the child is transferred to a wet-nurse or weaned, the better. Even if the mother be in good health and be well fed, her milk becomes, after a certain time, thin, watery, and insufficient for the wants of the growing child; hence the evil effects of prolonging lactation beyond the recognized period of nine months. It is usually the case that the milk of a healthy mother entirely suffices for the wants of the child during the first six months, and may be continued as its staple food for nine months, but during the latter portion of that time a little carefully selected and well-prepared farinaceous food should be added to the dietary. When from any cause the mother's milk proves insufficient for the needs of a young infant, a healthy wet-nurse should be obtained, or the child fed upon cow's milk, or ass's milk if that be procurable. If fed upon the mother's milk alone, the infant's nutrition will assuredly in such circumstances suffer, and it will begin to show signs of feeble health, which, if not arrested, may lead up to the development of rickets.

Excess of Farinaceous Foods.—Too often the attempt is made to supply the deficiency in the milk by giving to young children farinaceous foods in quantities which they cannot digest, and which therefore, since they produce indigestion and flatulence, only increase the mischief.

Drs. Meigs and Pepper, in their work on the diseases of

children, while they deprecate most strongly the giving of a large amount of farinaceous food, yet consider that a small amount of starchy material given in the milk, by preventing its coagulation into hard masses, does sometimes make the food more digestible. For young infants they give the preference to arrowroot. Where there is a tendency to diarrhœa, they recommend barley or wheat; and when the bowels are constipated, oatmeal. They have long used the following preparation, and believe it to be one of the best substitutes for the natural food: "To make this food, a scruple by weight of Russian isinglass or prepared gelatin, or a portion of gelatin cake two inches square, is soaked for a short time in half a pint of cold water. The water is then boiled until the gelatin is fully dissolved—about fifteen minutes. A small teaspoonful of arrowroot mixed into a paste with a little water is then stirred into the boiling water, after which the milk is added and allowed to boil for a few minutes. At the end of the boiling the cream is added."

Proportions of Milk.—The proportions of milk are: For the youngest children, one third; and for the older, one-half or two-thirds. Of cream, two tablespoonfuls are added to a pint of the food so long as this is one-third milk. When the food is half milk, one tablespoonful and a half of cream to the pint is the proper quantity; and when the food becomes two-thirds milk, one tablespoonful is to be added. To dilutions of two-thirds water and one-third milk there should be added about six and a half drachms of the sugar of milk; to dilutions of half and half, the quantity of sugar to be added is five and a half to the pint. If cane sugar is used, only half the above quantities should be employed. They further recommend that in the case of very weakly children the food should be more diluted than the proportions given above. For older children the food may be somewhat strengthened.

Dietary.—For a child sixteen or eighteen months old suffering from rickets Dr. Eustace Smith recommends the following diet:

7:30 A.M.—One or two teaspoonfuls of Liebig's food for infants (Mellin's), dissolved in a breakfast-cupful of milk.

11 A.M.—A breakfast-cupful of milk, with fifteen drops of the saccharated solution of lime in it.

2 P.M.—A good tablespoonful of well-pounded mutton chop,

with gravy, and a little crumbled stale bread; or a good tablespoonful of the flower of broccoli, well stewed with gravy until quite tender; a little dry bread. For drink, milk and water.

6 P.M.—Same as the first meal, or, if no meat has been given, the lightly-boiled yolk of one egg; a little thin bread and butter. Milk and water.

Later on a considerable proportion of animal food is desirable, and, where complete mastication cannot be secured, the meat must be pounded. Tonics, with iron, are frequently useful, but most reliance should be placed on cod-liver oil in addition to a liberal dietary. If difficulty is experienced in getting the oil well taken, a useful formula is the following, given by Drs. Meigs and Pepper:

℞ Ol. jec. aselli,	. . . .	f. ʒ i.
Pulv. acaciæ,	. . . .	q. s.
Ol. cinnamomi,	. . . .	gtt. vi.
Sacch. alb.,	. . . .	q. s.
Aq. cinnamomi,	. . . .	q.s. ad f. ʒ iij.

Dose.—A dessertspoonful three times a day after eating.

Neurosal Affections of Children.

In these days of competition and competitive examinations, when to most people success in life seems to depend not so much on good bodily growth as on early mental attainments, there is serious danger that in the case of children physical development may be neglected.

Over-Pressure.—The mischief is often to a great extent done before medical advice is sought. The doctor is consulted only when the child has become pale, thin, and restless; has lost appetite, starts and talks in sleep, and, above all, has lost interest in lessons. The other symptoms may perhaps go unheeded, but this one soon attracts attention. On inquiry, it will be found in the majority of such cases that the child's diet is thoroughly unsuited to the wants of the system; that its exercise and open-air life are limited, and its lessons heavy. No wonder, then, that nutrition flags and the child falls out of health. We are concerned here with the question of diet only; we must point out wherein the error lies, and what is the remedy therefor.

Unsuitable Diet.—To feed young, delicate children, of an excitable and unstable nervous system, on a stimulating dietary, consisting largely of animal food, and to give them tea and coffee and any form of alcoholic stimulant, with a view to strengthening them, is to overlook altogether and disregard the relation of special foods to particular constitutions and states of system. A highly nitrogenous diet, especially in cases where the child does not take much active exercise in the open air, besides worrying the nervous system with excess of waste products, throws a great strain on the excretory organs. The urine contains a deposit of lithates, the bowels become constipated or irregular in action—constipation alternating with diarrhœa—and this condition of malassimilation and defective nutrition often lays the foundation for serious organic disease in after-life.

Defective Nutrition.—This defective nutrition, in these cases from over-feeding of a kind, is just as marked and as serious to deal with as the same condition, produced by an insufficient amount of food, in the children of the poor. Another way in which impaired digestive power is produced and kept up is by the evil habit, so often contracted by children, of eating cake, buns, or sweets between meals. The appetite for plain, substantial food is taken away, and the stomach is unable to do its work properly at regular meal-times. Hence the twofold evil—an insufficient quantity of good food, and imperfect digestion of the food that is taken.

Plain Food.—Healthy children, who have plenty of open-air exercise, do not require tempting dishes to make them eat, and, on the other hand, provided the child has been trained to eat its food slowly, and to masticate it thoroughly, there is little fear of a healthy child eating too much plain food.

"The nutritive functions are predominantly active for the purpose of carrying on growth and repairing the rapid waste caused by youthful activity, that if the natural craving for exercise in the open air be freely indulged, and due attention be given to the development of the bodily frame, the young may very safely be left to choose for themselves both the quality and quantity of their food. In such circumstances the natural taste inclines so essentially to the preference of plain, substantial nourishment that there is very little risk of excess being committed. But where the parents are intent

only on the intellectual advancement of their children, and accustomed to subject them daily to many successive hours of confinement and study, with only an hour or so of relaxation in the open air, as is too commonly the case both with those educated at home and in boarding-schools, an artificial state of being is produced, which makes the rule no longer applicable, and renders necessary a more careful attention to dietetic regimen."—*Combe.*

Animal Food.—"Among the higher classes of society the unrestricted use of the most exciting kinds and preparations of animal food, and the daily use of wine, are the means generally resorted to for the removal of the delicacy thus engendered; but when we consider the real state of the case, no remedy can seem more preposterous. The evils to be corrected are imperfect nutrition and want of strength. Now, the imperfect nutrition is caused, not by deficient food, but by impaired powers of digestion and assimilation; and these suffer because the lungs are denied the free air, the muscles their necessary exercise, the brain its cheerful recreation, and the circulation the healthy stimulus which these united conditions infallibly produce."—*Combe.*

Neurotic Children.—The children of neurotic parents, inheriting as they do, often in an increased degree, the parental tendencies, suffer most under bad dietetic arrangements, and frequently develop symptoms of definite nerve disorder. Keen at lessons, highly sensitive, disinclined for exercise and boisterous games, they are often to be found in a quiet corner with a book when other more robust children are romping and shouting in the open air. They eat poorly of simple food, and often have a craving for stimulating and unwholesome articles of diet. These are for the most part the children that come under our notice, presenting the symptoms we have briefly enumerated, and they require careful dieting. The notion that all children should be brought up alike is a too common one; and yet there is good reason for believing that much permanent good or harm does result from the continuance of a suitable or an unsuitable dietary in childhood and during the period of rapid growth.

Delicate Children.—We have in passing alluded to the diet of healthy children, placed in favorable hygienic conditions, and have seen that no special care beyond the selection

of plain, wholesome food is required; but it is different in regard to delicate and neurotic children, with whose case we are now more particularly concerned. Their food must be more carefully selected, must be more dainty, and must be given in smaller quanties at a time, until the digestive organs have regained vigor, when a return to ordinary diet will be permissible. Children of this type have little appetite in the morning. They should have no work to do before breakfast, and they should not be up and about so early as to be exhausted before the breakfast-hour arrives.

Dietary.—Breakfast.—If a small plate of porridge and cream, followed by a slice of brown bread and butter, can be taken, it forms an excellent meal. Some children prefer bread and boiled milk or rusks and milk now and then for the sake of variety, which is often a point of importance in these cases; a cup of cocoa with plenty of milk in it, brown bread and butter, with an egg or a slice of bacon, may be substituted.

Lunch.—In the middle of the forenoon a teacupful of milk and a biscuit, or bread and butter.

The midday dinner should be the chief meal of the day, and should consist of a small slice of tenderly cooked meat or chicken, or a piece of fish with a little mashed potato or grated potato and well-boiled green vegetables, and a milk-pudding with stewed fruit; a small glass of water may be given, but not till toward the close of the meal.

Tea should be a small meal, if the dinner has been adequate—a cup of warmed milk or of cocoa, with brown bread and butter. If dinner has not been sufficiently hearty, an egg may be given at tea.

Supper.—A cup of bread and milk, or a plain milk-pudding.

Fruit.—Ripe fruit may be added at breakfast, and is especially useful where there is a tendency to constipation. In some cases of greater delicacy it may be advisable to give the egg beaten up in milk at breakfat or at tea.

Fat.—It is most desirable to have a good proportion of fat in some form in the dietary. Where it cannot be taken in sufficient quantity as fat of bacon or of beef, or as butter and cream, it should be given in the shape of cod-liver oil.

CHAPTER XIX.

ALCOHOL.

A SHORT consideration of the place and uses of alcohol can hardly be separated from questions of clinical dietetics.

However strong the feeling may be that the regular daily use of alcoholic beverages is unnecessary, or even hurtful, to the majority of healthy people, it can hardly be denied by the most ardent advocates of total abstinence that in many cases of illness alcohol is not only a beneficial, but a necessary adjunct to the treatment.

The action of alcohol upon the body may be divided into its local and its general effects, and the latter subdivided into immediate effects and those that are remote.

Effects of Small Doses.—Suppose a person totally unaccustomed to the use of alcohol to sip for the first time a glass of, say, sherry or of port wine. He will describe the sensation in the mouth as one of some astringency, with slight burning or tingling, and with an increase in the flow of saliva. After the wine has reached the stomach, the circulation through the gastric mucous membrane becomes more active, and there is an increased secretion of gastric juice, with a feeling of warmth and a keener appetite for food. Next it will be noticed that the heart's action is stronger, and the pulse increased in force and in frequency. The circulation through the different organs of the body is fuller, and dilatation of the capillaries of the skin is evidenced by flushing of the face. The subject of the experiment will declare that he feels warmer, but the actual temperature of the body is found to be slightly lowered, owing to increased perspiration and the fact that the dilatation of the vessels of the skin brings more blood to the surface, thus, in a cool atmosphere, more rapidly reducing the temperature of the blood.

The effect upon the nervous system is one of stimulation, all the nervous centres taking on increased activity, and the

higher centres being affected before the lower ones. The feelings and emotions are excited, the imagination is more lively, and there is, for the time being, a feeling of greater physical strength. Our friend, after his glass of wine, is at first slightly talkative, perhaps argumentative; presently he becomes more affectionate, and, if the dose be powerful enough, there follows thickness of utterance, disinclination for mental effort, and a tendency to drowsiness.

Effects of Large Doses.—As regards the digestive organs, large quantities of alcohol pass beyond the point of stimulation and act as irritants, thus retarding the circulation and hampering the digestive processes (*cf.* p. 548).

Large amounts of alcohol produce effects upon the circulation and nervous system similar to those induced by small quantities, and in the same order, but in greater degree. The stage of excitement is more marked, and is rapidly followed by reaction and depression of function.

Recurring to the example already taken, if such a man as we have supposed imbibes a somewhat larger quantity of alcohol, or if any one accustomed to its habitual use takes a much larger amount than ordinary, all the symptoms of excitement are markedly present, but he speedily becomes intellectually dull and ceases to talk, the senses and finer feelings are blunted, then the voluntary muscles are affected and he walks with difficulty or cannot walk at all—cannot even stand. His breathing becomes slow and labored; beginning at the extremities, the whole body becomes cold, and death may result from paralysis of respiration or from failure of the heart.

These facts explain why deaths from exposure readily occur in persons under the influence of alcohol, and why alcoholic beverages are unsuitable for use by those who are continuously exposed in cold climates to very low temperatures.

Alcohol a Food.—It has often been questioned whether in reality alcohol is a food, but the balance of evidence is undoubtedly on the affirmative side. Alcohol, properly used, is a food of considerable value; and on the other hand, when improperly used, and when taken in excess, alcohol is a poison.

In health, when plenty of food is available and food is well assimilated, alcohol is not required; but, when food is scanty and assimilation defective, alcohol given in small quantity with the food not only aids digestion and assimilation, but, by

to some extent retarding oxidation, it makes the food go further than it would otherwise do. "Hammond found that when, on insufficient diet, he was losing weight, the addition of a little alcohol not only enabled him to reach his former weight, but to add to it" (Brunton).

Experimental Evidence.—The recent very interesting and valuable experiments of Sir William Roberts show what effects are produced upon both salivary digestion by small and by large quantities of alcohol. He found that spirits in not greater proportion than about five per cent did not interfere with salivary digestion, but rather tended to aid it by increasing the flow of saliva. The action of wines he found decidedly inhibitory, due to their acidity; for, when the acid was neutralized, there was no retardation. The same statement applies to beer.

As regards gastric digestion, different kinds of spirit were found very much alike in their action, which depended on the amount of alcohol they contained. Up to ten per cent of alcohol there was little or no difference; above that proportion the retarding power was manifest, until, with fifty per cent of alcohol, digestion was seriously interrupted.

"These experiments, therefore, indicate that ardent spirits, as usually employed dietetically by temperate persons, act as pure stimulants to gastric digestion, causing an increased flow of gastric juice, and stimulating the muscular contractions of the viscus, and so accelerating the speed of the digestive processes."—*Roberts.*

Wines.—Regarding the action of wines he says: "If we consider the copious proportions in which hock and claret are used dietetically, it becomes evident that their retarding effect on peptic digestion is often brought into play. . . . On the other hand, the more sparing use of these wines, a glass or two with dinner or luncheon, would evidently not produce any appreciable retardation of peptic action, but would, like corresponding doses of sherry, act as pure stimulants. In both these instances, as in some others, it seems to be indicated that by adjusting the quantities we may elicit diverse effects. With large quantities we may obtain retardation, with small quantities we may obtain acceleration, of gastric digestion." —*Roberts.*

Experience, as well as experimental evidence, shows that

the amount of alcohol taken by persons in good health in the twenty-four hours should not exceed the equivalent of one or one and a half ounces of absolute alcohol, and this, too, whether the beverage be wine, beer, or spirits.

Alcohol in Sickness.—During illness this amount will often have to be exceeded, but it is open to grave doubt whether the very large quantities sometimes employed are not useless, or even hurtful. The quality of the beverage selected, and the tolerance of the individual constitution, as well as the previous habits of the person with regard to the use of alcohol, have all to be taken into account in coming to a decision in particular cases.

Effects of Excess.—The evil effects that follow the continued use of alcoholic stimulants in excess are so well known as hardly to need mention. Digestion becomes seriously disordered; there are all the symptoms of chronic gastric catarrh, with usually morning vomiting. The heart is weak and the circulation feeble. Fatty degeneration and fibroid contraction of different organs are found in the later stages. The mental faculties are greatly impaired. The will is weak, and the impulses are uncertain. All this may take place without the individual ever taking enough at a time to make him intoxicated, or being, in the ordinary sense of the term, a drunkard. Occasional excess in alcohol does not produce such marked effects, as the system has time to recover itself between the bouts.

Alcohol with Food.—It has been already said that alcohol is not necessary to persons in perfect health; but to those who are of more feeble habit of body, with slow or imperfect digestive power, alcohol in limited amount is certainly often of use. It should, however, never be taken by such persons early in the day, or at any time as a stimulant to work upon, and it should be taken with or just after food, not upon an empty stomach. This is a good general rule; but it must be admitted that the local action of a very small quantity of alcohol upon the nerves of taste and upon the stomach may occasionally be applied with advantage at the beginning of a meal by those persons who, after some unusual fatigue, feel too tired to eat. A sip of wine or of dilute spirits and water at the commencement of the meal sometimes makes all the difference to the food being enjoyed and digested. The habitual use of such

appetizers as sherry-and-bitters before dinner cannot, however, even on this ground, be recommended. Persons of unstable nervous system should avoid alcohol altogether.

The value of alcoholic beverages in acute disease has already been discussed (p. 660). Some other points may here be summarized.

Summary.—A small or moderate amount of alcohol is useful in all cases where the action of the heart is weak. This may occur either in the later years of life or during convalescence from some acute illness, as well as during the course of acute disease, when there are signs of heart failure. The stimulant will, in these circumstances, help to sustain life, and so tide over a time of danger; and it is besides useful in so far as it increases appetite and aids the digestion of food. Alcohol without food is decidedly dangerous, and life cannot be continued for any length of time upon it alone.

CHAPTER XX.

PREPARED AND PREDIGESTED FOODS.

Prepared and Predigested Foods.

Some patients have difficulty in digesting starch, and in those cases where this defect exists the addition of malt to the farinaceous substance is very useful, partly on account of the nutritive qualities of the malt itself, but mainly because of the diastase and the action which that principle has in converting starch into dextrin and sugar.

Use of Malt.—Malt may be employed either in powder or in the form of an extract, and may be added to farinaceous foods, such as milk-pudding, just before they come to the table and after they have cooled down to the temperature at which they can comfortably be eaten. If the malt extract be added while the temperature of the food is still high, the effect is lost, as the activity of the diastase is stopped by the heat. The malt may also, if preferred, be taken along with the food or immediately after it, but is comparatively useless if taken some considerable time after the food. Of prepared foods containing malt in combination with farinaceous substances, many varieties are now sold.

Prepared Foods.—Many preparations usually named "foods for invalids and infants," and of which the basis is baked flour of some sort, with malt and with or without dried milk, can be obtained. While these foods hold a useful place in the dietaries of the two classes for whom they are intended, they are, it is to be feared, too often used as substitutes for, instead of adjuncts to, milk. Those foods that contain milk have of course the higher nutritive value, and those containing sugar and malt are most valuable as additions to milk. Without milk and sugar they form by themselves a very insufficient food, but they may be added to broths or beef-tea, and given as useful alternatives to milk.

The predigestion of starch by heat was recognized before the introduction of prepared farinaceous foods, as is seen in the use of "tops and bottoms" for infants' food. A further great advance was made by the addition of malt to these foods, and a typical one early introduced is "Liebig's food for infants and invalids," containing malt powder, milk, baked wheaten flour, and saline matter. Another is that prepared by Messrs. Allen, Hanburys & Co., of which they give the following analysis.

Analysis of Allen & Hanburys' Food.—One pound of malted food contains—

Starch rendered soluble by diastase, together with dextrin, maltose, and other soluble substances,	13 oz.	130 gr.
Albuminoids,	1 "	420 "
Water,		143 "
Fat,		60 "
Cellulose,		123 "
Undetermined substances,		44 "
Mineral matter = phosphates, etc.,		72 "

For one part of flesh-formers there are six parts of heat-producers, reckoned as starch.

Kepler's Extract of Malt.—A reliable form is the Kepler extract of malt. A small teaspoonful added to a farinaceous pudding or a plate of oatmeal porridge so acts upon the starch that in a comparatively few minutes liquefaction takes place. When symptoms of malnutrition are present, and especially when there is reason to believe that the system has difficulty in dealing with amylaceous substances, the malt extract should be given a fair trial.

Predigestion of Foods.—Predigestion of food is necessary in cases where the digestive powers are so enfeebled that suitable food in ordinary forms cannot be digested. In such circumstances predigested foods are undoubtedly useful. In functional disorders they are of doubtful value, and they should not be resorted to until ordinary means have been tried and have failed.

In organic diseases of the stomach and bowels they are very valuable, but they are useless, if not injurious, where it

is the secondary digestive processes that are at fault. So much for the digestion of starch.

Pepsin and Pancreatic Ferments.—Next come pepsin and the pancreatic ferments. Pepsin being the active principle of the gastric juice, retains its activity only in the presence of an acid; hence the addition of a little dilute hydrochloric acid frequently aids the action of pepsin. Pepsin should be given at or just after those meals at which animal food is taken, since it acts upon albuminoids, and not upon farinaceous substances, nor upon fats. Pepsin is useful in cases of weak digestion; for example, in the aged, or in persons recovering from acute diseases. It may be used in the form of powders or tabloids, which are very convenient, or in the liquid form. Of the last named, a useful combination is the acid glycerin of pepsin.

Pepsin with dilute hydrochloric acid may be used to predigest proteid foods, but it is found more convenient in practice to employ liquor pancreaticus, and to Sir William Roberts we are indebted for much valuable information of a practical sort as to its use. The pancreatic fluid extract acts in an alkaline medium only, and to meet this Sir William Roberts, in his experiments, combined an alkali with liquor pancreaticus, and gave the extracts some time after a meal, gastric acidity being then considerably reduced.

Benger's Liquor Pancreaticus.—To predigest foods, an ordinary extract of the pancreas of the pig, made by maceration of that organ in dilute spirit, can be used, but it is troublesome to prepare, and Benger's liquor pancreaticus is a very convenient form. In the case of milk, it is necessary to dilute it first, so as to prevent firm curdling, and an alkali must be added to prevent coagulation in the final boiling.

The full instructions are the following:

Peptonized Milk.—"A pint of milk is diluted with a quarter of a pint of water and heated to a temperature of about 140° F. Should no thermometer be at hand, the diluted milk may be divided into two equal portions, one of which is heated to the boiling point and added to the cold portion, when the mixture will be of the required temperature. Two teaspoonfuls of the liquor pancreaticus and ten grains of bicarbonate of soda are then added to the warm milk. The mixture is poured into a covered jug, and the jug is placed in a

warm situation under a cosey, in order to keep up the heat. At the end of an hour or an hour and a half the product is boiled for two or three minutes. It can then be used like ordinary milk."

Peptonized foods do not keep long without further change, and it is better, therefore, not to peptonize at one time more than is required for twelve hours' use. More or less liquor pancreaticus can be used, according to the extent to which it is wished to carry the peptonizing process. If carried to the full extent, a disagreeable bitter taste is developed.

Peptonized Gruel.—Any ordinary farinaceous substance, such as flour, oatmeal, or arrowroot, may be used. "The gruel should be well boiled, and made thick and strong. It is then poured into a covered jug, and allowed to cool until it becomes lukewarm. Liquor pancreaticus is then added in the proportion of a dessertspoonful to the pint of gruel, and the jug is kept warm under a cosey as before. At the end of a couple of hours the product is boiled and strained."

Peptonized Milk Gruel.—"A strong gruel of any farinaceous substance is made. To the boiling gruel add a like quantity of cold milk. The temperature of the united milk and gruel will be about 125° F. Add about two teaspoonfuls of liquor pancreaticus and ten grains of bicarbonate of soda (a small quantity of light magnesia has been suggested as an alternative alkali). Place this in a covered jug under a cosey for an hour and a half, then boil for two minutes, and strain."

Peptonized Beef-Tea.—"A pound of finely minced lean beef is mixed with a pint of water, and ten grains of bicarbonate of soda are added. The mixture is then simmered for an hour and a half in a covered saucepan. The resulting beef-tea is decanted off into a covered jug. The undissolved beef residue is then beaten up with a spoon into a pulp, and added to the beef-tea in the covered jug. When the mixture has cooled down to about 140° F. (or when it is cool enough to be tolerated in the mouth), a tablespoonful of the liquor pancreaticus is added, and the whole well stirred together. The covered jug is then kept warm under a cosey for two hours, and agitated occasionally. At the end of this time the contents of the jug are boiled briskly for two or three minutes, and finally strained. The product is then ready for use."

Peptonized Soups, Jellies, and Blanc-Mange.—"Soups may be prepared in two ways. The first way is to add what cooks call 'stock' to an equal quantity of peptonized gruel or peptonized milk-gruel. A second and better way is to use peptonized gruel, which is quite thin and watery, instead of simple water, for the purpose of extracting the soluble matters of shins of beef and other materials employed in the preparation of soups. Jellies may be prepared by simply adding the due quantity of gelatin or isinglass to hot peptonized gruel, and flavoring the mixture according to taste. Blanc-mange may be made by treating peptonized milk in a similar way, and then adding cream. In preparing all these dishes, it is absolutely necessary to complete the operation of peptonizing the gruel or the milk, even to the final boiling, before adding the stiffening ingredient; for if pancreatic extracts be allowed to act on the gelatin, the gelatin itself undergoes a process of digestion, and its power of setting or cooling is therefore utterly abolished."—*Sir William Roberts.*

Fairchild's Peptonizing Powders (Zymin).—These are very useful for peptonizing milk, and especially for use in the case of infants brought up by "bottle."

"Into a clean quart bottle pour a pint of fresh milk, one-quarter of a pint of cold water, and one peptonizing powder. Set this in water as hot as the hand can bear, for thirty minutes, shaking occasionally. It may now be used."

When not for immediate use, it should be boiled for two or three minutes, or put on ice to prevent the milk from becoming bitter. Keep in a cool place.

Half an hour is as long as the process should be allowed to proceed, or the product will be unpleasantly bitter. Boiling is necessary to prevent peptonization being carried out to the full extent and thus leaving nothing for the digestive organs to do.

Beef-tea may also be peptonized by the use of these powders.

Nutrient Enemata.

Occasions for the Use of Nutrient Enemata.—However undesirable it may be to depend upon nutrient enemata alone for any long-continued support of the body, there can be no doubt that they are most valuable in certain circumstances,

by enabling the patient to hold out and to maintain his strength until the crisis that called for their use has passed. Such crises arise sometimes in the course of acute gastric catarrh, in gastric ulcer, in ulceration of the small bowel, and in other circumstances when the stomach is intolerant of all food. Again, when very little food can be taken and retained by the stomach, the balance of nutrition may be kept up by the addition, twice a day, of a nutrient enema.

That the large bowel possesses, to a certain extent, powers of absorption is not now questioned, but it must be remembered that under ordinary circumstances the substances upon which its absorptive capabilities are exercised have been very much altered and prepared for absorption by the action of the gastric and intestinal juices in their passage down the bowel. In other words, the foods have been, to a great extent, digested before they reach the colon.

Use of Prepared and Predigested Foods.—This fact points strongly to the use of prepared and predigested foods in nutrient enemata. It may very well be doubted to what extent the old-fashioned enema of beef-tea, with a beaten-up egg, and some milk and brandy, was really absorbed. So far as the use of prepared foods, however, is concerned, we have every reason to believe that their predigestion renders them to a large extent capable of absorption by the large bowel. Sir William Roberts strongly recommends the use of the liquor pancreaticus as an addition to nutrient enemata, being convinced by his experience that it is very valuable for that purpose. A dessertspoonful should be added to an enema of beef-tea or of milk-gruel shortly before it is injected into the bowel. The prepared farinaceous foods may likewise be used in this way, and also beef peptones and malt extracts, with the addition, if necessary, of wine or spirit.

Some practical points in regard to the administration of nutrient enemata must be noticed.

Rules.—A nutrient enema must always be small in bulk. About two ounces is an average quantity for an adult; but if a long flexible tube can be easily passed well up the bowel, twice or three times that quantity may sometimes be comfortably retained.

A nutrient enema must be injected very gently and slowly, else contractions of the bowel and the evacuation of its contents will certainly be set up.

The temperature of the enema is important. It must be lukewarm, not hot, and certainly not cold.

Great care must be exercised in the introduction of the syringe. It must be passed gently into the bowel, and not pressed upon the mucous membrane each time at the same spot. If this rule be neglected, there is great risk that abrasion and ulceration will be set up. This point is of course of special importance where the use of enemata has to be continued for a length of time.

Vaselin or oil should be used to lubricate the tube, and, at the same time, the anus, to prevent irritation. If the rectum and anus become irritable, the nutrient enemata cannot be retained, and this method of feeding may thus fail us at a critical moment.

A few drops of laudanum added to a nutrient enema aids its retention, and gentle pressure, by means of a soft pad over the anus, is also helpful in cases where an enema is retained with difficulty.

Care must be taken to see that the rectum does not become loaded with fæces. Occasional washing out of the bowel with tepid water is useful.

CHAPTER XXI.

SICK-ROOM COOKERY.

1. *Beef Essence.*—Take one pound of gravy beef, free from fat and skin. Chop it up very fine; add a litte salt, and put it into an earthen jar with a lid; fasten up the edges with a thick paste, such as is used for roasting venison in, and place the jar in the oven for three or four hours. Strain through a coarse sieve, and give the patient two or three teaspoonfuls at a time.

2. *Beef Essence.*—Cut up in small pieces one pound of lean beef from the sirloin or rump, and place it in a covered saucepan, with half a pint of cold water, by the side of the fire for four or five hours; then allow it to simmer gently for two hours. Skim it well, and serve.

3. *Beef-Tea.*—Cut up a pound of lean beef into pieces the size of dice; put it into a covered jar with two pints of cold water and a pinch or two of salt. Let it warm gradually and simmer for a couple of hours, care being taken that it does not reach the boiling-point.

4. *Nutritious Beef-Tea.*—To a pint of beef-tea or mutton-broth (not too strong) add two tablespoonfuls of powdered biscuits or bread crumbs; boil for five minutes, stirring well all the time.

5. *Beef-Tea with Oatmeal.*—Mix two tablespoonfuls of oatmeal, very smooth, with two spoonfuls of cold water; then add a pint of strong boiling beef-tea. Boil together for five or six minutes, stirring it well all the time. Strain it through a sieve, and serve.

6. *Mutton-Broth.*—Cut one pound of lean mutton into dice; to this put one quart of cold water, then let it simmer on the hob for three hours; take off the scum as required, and add a pinch of salt. Strain off the fluid, let it stand till it is cold, then remove the fat, if any.

7. *Mutton-Broth.*—Two or three pounds of neck of mutton,

two pints of water, pepper and salt, half a pound of potatoes, or some pearl barley.

Put the mutton into a stewpan, pour the water over it, add pepper and salt. When it boils, skim carefully; cover the pan, and let it simmer gently for an hour. Strain it, let it get cold, and then remove all the fat. When required for use, add some pearl barley or potatoes in the following manner: Boil the potatoes, mash them very smoothly, so that no lumps remain; put the potatoes into a pan, and gradually add the mutton-broth, stirring it till it is well mixed and smooth; let it simmer for five minutes, and serve with fried bread.

8. *Chicken-Tea.*—Cut up a fowl in small pieces; put it into an earthen vessel with some salt and three pints of water; let it boil three hours, set it to cool, then take off the fat.

9. *Calf's-Foot Broth.*—One calf's foot, three pints of water, one small lump of sugar, the yolk of one egg.

Stew the foot in water, very gently, till the liquor is reduced to half; remove the scum, set it in a basin till quite cold, then take off every particle of fat. Warm up about half a pint, adding the sugar; take it off the fire for a minute or two, then add the beaten yolk of the egg. Keep stirring it over the fire till the mixture thickens, but do not let it boil, or it will be spoiled.

10. *Mutton-Broth.*—Take a pound of mutton, cut it up into small pieces, take a thick slice of bread, toast one-half of it a rich brown color, crumble the other half, and put it into two quarts of cold water with any flavoring preferred, or even without any: boil gently to a pint and a half, and strain. Take off the fat when cold, if it be objected to.

11. *Veal-Broth.*—A knuckle of veal, two cow-heels, twelve peppercorns, a glass of sherry, and two quarts of water.

Stew all the ingredients in an earthen jar six hours. Do not open it till cold. When wanted for use, skim off the fat and strain it. Heat as much as you require for use (Ringer).

12. *Egg and Brandy.*—Beat up three eggs to a froth in four ounces of cold water, add two or three lumps of sugar, and pour in four ounces of brandy, stirring all the time. A portion of this to be given at a time.

13. *Egg and Sherry.*—Beat up with a fork an egg till it froths, add a lump of sugar and two tablespoonfuls of water;

mix well, pour in a wineglassful of sherry, and serve before it gets flat.

14. *Caudle.*—Beat up an egg to a froth, add a wineglassful of sherry and half a pint of gruel; flavor with lemon-peel and nutmeg, and sweeten to taste.

Another Caudle.—Mix well together one pint of cold gruel with a wineglassful of good cream; add a wineglassful of sherry and a tablespoonful of noyeau, and sweeten with sugar-candy.

15. *Milk and Isinglass.*—Dissolve a little isinglass in water, mix it well with half a pint of milk, then boil the milk, and serve with or without sugar, as preferred.

16. *Arrowroot.*—Mix two teaspoonfuls of the best arrowroot with half a wineglassful of cold water; add a pint of boiling water; put it into an enamelled saucepan, and stir over the fire for three minutes. Sweeten with three teaspoonfuls of sifted loaf-sugar.

17. *A Gruel.*—Beat up an egg to a froth; add a wineglass of sherry; flavor with a lump of sugar, a strip of lemon-peel, and a little grated nutmeg. Have ready some gruel, very smooth and hot; stir in the wine and egg, and serve with sippets of crisp toast. Arrowroot may be made in the same way.

18. *Oatmeal-Gruel.*—Put a pint of boiling water into a saucepan; into this stir a couple of tablespoonfuls of oatmeal until quite smooth; let this boil well for ten or fifteen minutes; season with salt, then strain through a strainer.

19. *Tamarind-Water.*—Boil two ounces of tamarinds with a quarter of a pound of stoned raisins in three pints of water for an hour; strain, and when cold it is fit for use.

20. *Arrowroot and Black-Currant Drink.*—Take two large spoonfuls of black-currant preserve; boil it in a quart of water; cover it, and stew gently for half an hour, then strain it, and set the liquor again on the fire; then mix a teaspoonful of arrowroot in cold water, and pour the boiling liquor upon it, stirring meanwhile; then let it cool.

21. *Cream of Tartar* (*Potus Imperialis*).—Put half an ounce of cream of tartar, the juice of one lemon, and two tablespoonfuls of sifted sugar into a jug, and pour over a quart of boiling water. Cover till cold.

22. *Rice-Water.*—Wash three ounces of rice in several waters, and then put it into a clean stewpan with a quart of

water and one ounce of raisins; boil gently or half an hour, and strain into a jug. When cold it is ready for use.

23. *Snow-Pudding.*—Put into half a pint of cold water half a package of gelatin. Let it stand one hour; then add one pint of boiling water, half a pound of sugar, and the juice of two lemons. Stir and strain, and let it stand all night. Beat very stiff the whites of two eggs and beat well into the mixture. Pour into a mould.

24. *Lemonade.*—Express the juice of a large-sized lemon and strain it. Put it into a jug, adding about a third of the rind, cut thin, and four or five pieces of lump sugar. Pour over this one pint of boiling water, and cover it over for two hours. Strain, and when cool it is ready for use.

25. *Milk Lemonade.*—To a pint of boiling water add six ounces of loaf sugar, six ounces of lemon juice, a like quantity of sherry, and sixteen ounces of cold milk. Stir thoroughly, and strain through a jelly bag.

26. *Rice and Milk.*—To a quart of milk add a quarter of a pound of rice which has been well washed; simmer for an hour, stirring very frequently. Flavor with cinnamon or lemon peel, and just before serving sweeten to taste.

27. *Oatmeal Porridge.*—Boil some water quickly in a saucepan, and add to it a pinch of salt. Into the water sprinkle some oatmeal, stirring briskly all the time. Let it simmer for at least half an hour. The porridge may be made thick or thin, according to taste.

28. *Milk Porridge.*—Into half a pint of water put two ounces of oatmeal. Let it soak for ten or twelve hours; then pass it through a sieve into a saucepan; boil for half an hour, and before serving add five or six ounces of milk.

29. *Whole-Meal Porridge.*—Into a quart of boiling water sprinkle slowly half a pound of wheat meal, and boil till thoroughly soft. It may be served like ordinary porridge with milk or sugar, or marmalade or treacle, or Kepler's extract of malt.

30. *Irish Moss.*—Wash well an ounce of Irish moss, and then let it soak for four or five hours in a quarter of a pint of cold water. Add half a pint of milk and half a pint of water (or a pint of milk); boil from five to seven minutes, and strain through muslin. It may be flavored with cinnamon or vanilla or simply sweetened with sugar, and when cool will set firmly.

31. *Toast-Water.*—Boil a quart of water, and pour it upon a good-sized piece of crumb of bread, which has been well toasted before a clear fire until it becomes very crisp and of a dark brown color (not black). Let it steep for half an hour, and then decant it into a jug.

32. *Barley-Water.*—Put an ounce of barley into an enamelled saucepan with a quart of cold water, and boil for two hours. Stir it, and skim it occasionally. Strain through muslin, and sweeten with a little sugar candy. The juice of a lemon, strained, may be added.

33. *Milk, Egg, and Brandy.*—Scald some new milk, but do not let it boil. It ought to be put into a jug, and the jug should stand in boiling water. When the surface looks filmy, it is sufficiently done, and should be put away in a cool place in the same vessel. When quite cold, beat up a fresh egg with a fork in a tumbler, with a lump of sugar; beat quite to a froth, add a dessertspoonful of brandy, and fill up the tumbler with scalded milk.

34. *Port-Wine Jelly.*—Put into a jar one pint of port wine, two ounces of gum arabic, two ounces of isinglass, two ounces of powdered white sugar-candy, a quarter of a nutmeg grated fine, and a small piece of cinnamon. Let this stand closely covered all night. The next day put the jar into boiling water, and let it simmer till all is dissolved; then strain it, let it stand till cold, and then cut it up into small pieces for use (Ringer).

35. *Bread Jelly.*—Take three or four slices of bread, remove the crust, and toast them to a light brown color. Put the bread into a pan with two pints of cold water, and simmer for an hour and a half or two hours; strain through muslin, sweeten, and flavor with a little wine and lemon juice. Pour into a mould, and turn out when required for use.

36. *Wine Jelly.*—Into an enamelled saucepan put a pint of cold water; add an ounce and a quarter of Russian isinglass and three ounces of sugar. Let this boil gently till the isinglass is dissolved, removing the scum from time to time. Strain, and add the juice of one lemon or of two oranges, and a third of a pint of sherry. Pour into a mould, and turn out when required.

37. *Chicken Panada* (1).—Take the flesh from the breast of a fresh roasted chicken; soak the crumb of a French roll or a few rusks in hot milk, and put this in a clean stewpan, with

the meat from the chicken previously reduced to a smooth pulp by chopping it and pounding it in a mortar; add a little chicken-broth or plain water, and stir the panada over the fire for ten minutes.

38. *Chicken Panada* (2).—Half a chicken is required for one panada. Take the flesh off the bones, cut it into small pieces, and put them into a gallipot, sprinkling over them half a saltspoonful of salt. Cover the top of the gallipot with paper, tied down, and stand it in a saucepan half full of boiling water. Let it simmer for two hours. Take out the pieces of chicken with a spoon, put them in a mortar, and pound them to a pulp. Pass the pounded chicken through a sieve, adding a little of the liquor to make it pass more easily. Stir into the basin with the pulp one tablespoonful of cream.

39. *Game Panada.*—Prepare in the same manner as the foregoing. The breast of a pheasant or partridge may be used in place of chicken.

40. *Nourishing Soup.*—Take a pound of good lean beef and a pound of mutton, and cut them into pieces the size of dice. Take also a calf's foot and split it. Put them into a jar with two quarts of cold water, and let them simmer in the oven for five or six hours, adding about the middle of that time another quart of water and some simple seasoning. When the quantity is reduced to one and a half quarts, take it out of the oven and strain. When cold, remove the fat. This soup may be taken cold, or may be warmed up with a little pepper and salt.

41. *Tapioca Soup with Cream.*—Take a pint of white stock and pour into a stewpan. When it comes to the boil, stir in gradually one ounce of prepared tapioca. Let it simmer slowly by the side of the fire until the tapioca is quite clear. Put the yolks of two eggs into a basin, with two tablespoonfuls of cream. Stir with a wooden spoon, and pour through a strainer into another basin. When the stock has cooled, add it by degrees to the mixture, stirring well all the time, so that the eggs may not curdle. Pour it back into the stewpan, and warm before serving. Add pepper and salt to taste.

41*a*. *Purée of Potatoes.*—Take one pound of potatoes, peel them and cut them in thin slices, also two leaves of celery well washed. Put an ounce of butter in a stewpan, add the

potatoes and celery. Put the stewpan on the fire and let the vegetables sweat for five minutes, taking care they do not discolor. Pour into the stewpan one pint of good white stock; stir frequently to prevent burning. Let it boil gently till the vegetables are quite cooked. Heat half a pint of the white stock in another stewpan. Pass the contents of the first stewpan through a sieve into a basin, adding by degrees the half-pint of hot white stock, which will enable it to pass through more easily. Pour the *purée* back into the stewpan, and season according to taste, adding a quarter of a pint of cream. Stir smoothly till it boils.

42. *Cream of Barley.*—Take half a pound of veal cutlet; pare off all the fat, and cut the lean into small pieces. Put this into a saucepan with one pint of cold water; add half an ounce of well-washed barley that has soaked for an hour or two in cold water, and half a saltspoonful of salt. Let it boil for two hours. Strain off the liquor, and put the meat and barley in a mortar. Pound them together, and then rub them through a sieve, pouring on the sieve a little of the liquor. Stir in two tablespoonfuls of cream.

43. *Maccaroni with Milk.*—Take half a pound of maccaroni; wash it, and put it in a saucepan of cold water with a tablespooonful of salt. Let it boil for half an hour: then pour out the water, and add to the maccaroni one quart of milk, and let it simmer gently for an hour.

44. *Maccaroni* (*Stewed in Stock*).—Take half a pound of maccaroni; put it into a saucepan of cold water with a dessertspoonful of salt. Let it boil for ten minutes, and then put the maccaroni into a colander and run some cold water on it. After draining it, turn it on a board and cut it into small pieces. Put the maccaroni thus cut up into a saucepan with one pint of good white stock. Bring it to the boil, and let it simmer gently for ten minutes. Season with pepper and salt to taste, and serve on a hot dish.

45. *Lamb's Head.*—Take out the brains and cut them up fine, and stew them in a white sauce. Stew the head till quite tender. Take the meat off the bones; lay it on the centre of a dish; egg and bread-crumb it, and brown in an oven. Serve with brain sauce poured round the dish.

46. *Cow-Heel Fried.*—Stew the heel about eight hours until the meat leaves the bone easily; press it between two

plates till cold and set; cut it into strips, roll them up; egg and bread-crumb them, and fry them. Or,

Simply stewed, and the meat, when taken from the bone, served with good stock sauce.

47. *Ox Palates.*—Boil the ox palates about eight hours; then skin them, and serve with a good brown gravy.

48. *Sweetbread.*—Soak one sweetbread in water for an hour; then change the water and soak for another hour; then put them into boiling water and let them simmer for ten minutes, or rather more, till they become firm; drain, and when cool brush well over with beaten-up egg; roll them in bread crumbs, dip again in egg, and add some more bread crumbs; sprinkle over them a little oiled butter, and bake in an oven, basting them till they are sufficiently done and of a bright brown color. Serve on toast, with a little brown gravy around the dish.

49. *Sweetbread with White Sauce.*—Soak one sweetbread for an hour. After boiling for ten minutes, put it into cold water for twenty minutes. Pour over it, while in a saucepan, half a pint of good white stock; season according to taste. Simmer gently for half an hour; take it out and keep it warm in the oven. Let the sauce boil, thickened with a little flour and butter, and when quite smooth stir in two tablespoonfuls of cream. Place the sweetbread on a dish; add a teaspoonful of lemon juice to the sauce, and pour it over.

50. *Calf's Head.*—Take half a calf's head; soak it well in cold water. Parboil it in water, to which has been added a little salt, for nearly half an hour. Put it into a stewpan with seasoning; add a little water, and let the whole boil gently for an hour and a half. Serve with parsley sauce poured over it, and small pieces of fat bacon fried. The tongue and brains may be served on the same dish or separately.

51. *Tripe.*—Take half a pound of clean fresh tripe, and wash it in cold water; then cut into small squares, taking care to leave but little fat. Put half a pint of milk into a stewpan, with a pinch of salt, and one of castor-sugar; add a little mustard. Put the tripe into the stewpan, let it boil up, skimming carefully. It should now be allowed to simmer for three or three and a half hours, and should be stirred frequently during that time. Mix a teaspoonful of corn flour with a little cold milk to a smooth paste, and stir it in. After simmering

for five minutes more, it may be served on a hot dish, with the sauce poured over it.

52. *Breast of Lamb with Vegetables.*—Take the breast of tender lamb, cut away the skin and most of the fat. Divide it into small pieces, and sprinkle with flour. Brown them in a stewpan with a little butter; add as much warm water as will cover the meat. Flavor with vegetables to taste, and add pepper and salt. Remove the fat, and simmer for an hour and a half. Before simmering, a pint of young peas or tender broad beans may be added. If these are not in season, pearl-barley answers well.

53. *Kedgeree.*—Take some cold cooked fish, break it well down. Boil for half an hour a cupful of rice in white stock. Mix the fish with the rice, and when the whole is heated stir in an egg.

54. *Fish Soup.*—Take the liquor in which fish has been boiled. Take also the bones, skin, and other parts, and put them into two pints of the liquor, and let it simmer till reduced to two-thirds of its bulk. Strain, and season with vegetables, as well as salt and pepper and a few drops of anchovy. When about to be served, stir in a small cupful of boiling milk.

55. *Calf's-Foot Jelly.*—Take two calf's feet, split them, boil them in one quart of water; skim them thoroughly, and let them simmer for about four hours. Strain, and when cold remove the fat. Put into a stewpan with one pound of sugar the juice of six lemons, the rind of three, half a stick of cinnamon (bruised). Let this dissolve over a slow fire, and then add the whites of three eggs, well whipped up with five ounces of water, and continue until it begins to boil. Add half a pint of sherry; allow it to simmer gently for another quarter of an hour. Strain through a jelly bag. Repeat the straining several times, and pour into moulds.

56. *Blanc-Mange.*—Put a quart of milk into a saucepan with three ounces of loaf sugar, and one inch of cinnamon-stick or a small piece of lemon-peel for flavoring. Let it boil. Put four tablespoonfuls of corn flour into a basin, and mix it smoothly with a little cold milk. When the milk in the saucepan is quite boiling, stir in the corn flour quickly, and let it boil for two minutes, stirring continually. Remove the flavoring, and pour into a mould. A little cream added to the milk is an improvement.

57. *Arrowroot-Pudding.*—Take a dessertspoonful of arrowroot, put it into a basin with the yolks of two eggs, a dessertspoonful of milk and a teaspoonful of castor-sugar. Whip it smoothly into a paste. Take a saucepan, and put into it half a pint of cold milk. Watch the milk carefully till it boils. When quite boiling, pour it on to the arrowroot mixture, stirring all the time to get it quite smooth. Whip the whites of the two eggs, and add them to the mixture, stirring them lightly together. Pour the mixture into a buttered dish, and put it in a quick oven for ten minutes.

58. *Light Pudding.*—Make into a smooth paste a teaspoonful of flour, and pour over it six ounces of boiling milk, slightly flavored, if desired. Stir well, while adding a teaspoonful of sugar and a pinch of salt; when cold strain, and add it to a beaten-up egg. Pour the whole into a basin (buttered), and bake for twenty minutes in the oven.

59. *Custard* (1).—Boil a pint of new milk in an enamelled saucepan for two or three minutes, with three ounces of loaf sugar, and the rind of half a lemon cut into thin slices. Allow it to cool for a few minutes. Beat up five eggs, and while stirring briskly add the milk to the eggs. Put the mixture again into the saucepan, and warm it over a gentle fire, constantly stirring till it begins to thicken. Strain through a fine sieve, and add two wine-glasses of good cream. The custard may be flavored with brandy or with a liqueur.

60. *Custard* (2).—Take two eggs to a gill of milk, beat the eggs, and warm the milk before adding it to the eggs. Put it into a jug, and the jug into a pan of boiling water, and stir it till it thickens. It takes about a quarter of an hour.

61. *Rice-Pudding.*—Into half a pint of milk put two teaspoonfuls of rice well washed. Boil for two hours, stirring frequently, and sweeten with pounded sugar; take it off the fire and allow it to cool for a quarter of an hour. Then stir in the yolks of two eggs well beaten up. Bring it again to the boiling point, and boil for about one minute, stirring the while.

62. *Rice-Cream.*—Boil three ounces of rice in a quart of milk till quite soft; when cold, whip into it a teacupful of good cream, and half an ounce of isinglass melted in milk; when well whipped, pour into a mould with a hollow centre, and turn out when quite firm. Fill the centre with fresh

stewed fruit or with any good preserve; whip up a pint of thick cream and pour it over the shape.

63. *Corn Flour.*—Mix a dessertspoonful of corn flour with four or five tablespoonfuls of milk. Boil half a pint of milk, and add this to the corn flour paste, stirring over the fire for four or five minutes; sweeten to taste, and, if allowable, add a tablespoonful of cream.

64. *Hominy Pudding.*—Soak for ten or twelve hours half a pint of hominy in a pint and a quarter of boiling water (the vessel should have a well-fitting cover). When thoroughly soaked, put the hominy into a pudding dish with a pint of milk, and bake in the oven for twenty or thirty minutes.

65. *Blanc-Mange.*—Take one ounce of pure isinglass, and dissolve it in a saucepan over a slow fire in one pint of milk. To this add half the rind of a lemon and half a pint of cream. After boiling for ten or fifteen minutes, take out the lemon rind, sweeten and flavor to taste. Before pouring into a mould, a little wine or brandy may be stirred in.

66. *Cream.*—Whip a pint of good cream to a froth. When thoroughly whipped, add a liqueur glass of brandy, or of a liqueur, six ounces of castor-sugar, and two ounces of isinglass. Mix thoroughly, and pour into a mould. When cold it is ready for use, and may be turned out.

67. *A Ripe Fruit Cream* (*e.g., Strawberry*).—Take a basket of strawberries, bruise the fruit, with six ounces of castor-sugar. Then rub through a hair sieve, add a pint of whipped cream and two ounces of pure isinglass; when thoroughly mixed, pour into a mould. Raspberries, etc., may be used in the same way.

68. *Chocolate Cream.*—Take three ounces of grated chocolate, and put it into a stewpan, with half a pint of boiled milk, three ounces of sugar, and the yolks of four eggs. Stir on the fire till it thickens: pass through a hair sieve, add one ounce of gelatin, and when thoroughly mixed pour into a mould.

69. *Summer Fruit Pudding.*—Line a pudding-basin with bread and butter; have stewed fruit ready (red-currants and raspberries or strawberries are best because of their juice). Mix plain bread-crumbs with the fruit, and put into the basin. Turn it out and cover it with custard. The pudding must be made the day before it is used to fix it thoroughly, and to allow the bread to become saturated with the fruit.

70. *Apple Charlotte.*—Take two pounds of good cooking apples peeled, and cut into slices without the cores. Put the slices into a stewpan with sufficient sugar to sweeten them and quarter of a pint of water. Take the rind of a lemon and tie it together with a piece of string, and put it into the stewpan with the apples. Stir all on the fire till it boils, and the apples are reduced to about half their quantity. It will take from one to one and a half hours. Take out the lemon-peel; cut a slice of the crumb of bread; line the mould at the bottom and sides, having first dipped the slices into clarified butter. Pour the apples into the mould and cover over with a round of bread like that lining the bottom of the mould. Bake in an oven for three-quarters of an hour.

71. *Charlotte Russe.*—Take a pint tin; line it inside with finger-biscuits, fitting the biscuits close to each other, and cutting off any points that remain above the tin. Put half an ounce of the best gelatin with a quarter of a pint of cold milk, and let it soak well. Take half a pint of double cream and whip it in a basin to a stiff froth; add a dessert-spoonful of sifted sugar, and flavor with vanilla, lemon, or orange. Put the stewpan on the fire and stir the gelatin till it is melted. Pour the melted gelatin through a sieve, and stir into the cream.

72. *Omelet Soufflé.*—Break two eggs; put the whites in one basin, the yolks in another. Put one teaspoonful of orange-flower water and one tablespoonful of castor-sugar into a stewpan. Let them boil quickly for three minutes. Then pour it into a cup to cool, adding to it the yolks of the eggs, and beat them to a cream; add a pinch of salt to the whites of egg and whip them to a stiff froth; add the whites to the mixture in the basin, and mix them together very lightly. Put half an ounce of butter into a frying-pan, and when the butter is hot pour in the mixture. Let it remain on a slow fire for about two and a half minutes; then put the pan into a hot oven for three or four minutes. Melt a dessert-spoonful of jam. Take the soufflé out of the oven, turn it on to a hot dish; spread the jam upon it and fold it over like a sandwich. Sprinkle it over with white sugar.

73. *Omelet (savory).*—Made as above, omitting the jam, sugar, and orange-flower water, and adding salt and pepper, with parsley and other herbs.

74. *Peptonized Milk.*—"A pint of milk is diluted with a quarter of a pint of water, and heated to a temperature of about 140° F. Should no thermometer be at hand, the diluted milk may be divided into two equal portions, one of which is heated to the boiling-point, and added to the cold portion, when the mixture will be of the required temperature. Two teaspoonfuls of the liquor pancreaticus and ten grains of bicarbonate of soda are then added to the warm milk. The mixture is poured into a covered jug, and the jug is placed in a warm situation under a 'cosey' in order to keep up the heat. At the end of an hour or an hour and a half the product is boiled for two or three minutes. It can then be used like ordinary milk."

"The object of diluting the milk is to prevent the curdling which would otherwise occur, and greatly delay the peptonizing process. The addition of bicarbonate of soda prevents coagulation during the final boiling, and also hastens the process. The purpose of the final boiling is to put a stop to the ferment action—when this has reached the desired degree—and thereby to prevent certain ulterior changes which would render the product less palatable. The degree to which the peptonizing change has advanced is best judged of by the development of a peculiar bitter flavor, which is always associated with the artificial digestion of milk. The point aimed at is to carry the change so far that the bitter flavor is just perceived, but not unpleasantly pronounced."

75. *Peptonized Gruel.*—"Gruel may be prepared from any of the numerous farinaceous articles in common use—wheaten flour, oatmeal, arrowroot, sago, pearl-barley, pea or lentil flour. The gruel should be well boiled, and made thick and strong. It is then poured into a covered jug, and allowed to cool until it becomes lukewarm. Liquor pancreaticus is then added, in the proportion of a dessert-spoonful to the pint of gruel, and the jug is kept warm under a 'cosey' as before. At the end of a couple of hours the product is boiled, and strained."

76. *Peptonized Milk-Gruel.*—"First, a thick gruel is made from any of the farinaceous articles above mentioned. The gruel, while still boiling hot, is added to an equal quantity of cold milk. The mixture will have a temperature of about 125° F. To each pint of this mixture two or three teaspoonfuls of

liquor pancreaticus and ten grains of bicarbonate of soda are added. It is kept warm in a covered jug under a 'cosey' for an hour or an hour and a half, and then boiled for two or three minutes and strained. If the product has too much bitter flavor, a smaller quantity of the liquor pancreaticus must be used in the next operation. Invalids take this compound as a rule, if not with relish, at least without any objection.

"As it is impossible to obtain pancreatic extract of absolutely constant strength, the directions as to the quantity to be added must be understood with a certain latitude."

77. *Peptonized Soups, Jellies, and Blanc-Manges.*—"Soups may be prepared in two ways. The first way is to add what cooks call stock, and to an equal quantity of peptonized gruel or peptonized milk-gruel. A second and better way is to use peptonized gruel, which is quite thin and watery, instead of simple water, for the purpose of extracting the soluble matters of skins of beef and other materials employed in the preparation of soups.

"Jellies may be prepared by simply adding the due quantity of gelatin or isinglass to hot peptonized gruel, and flavoring the mixture according to taste.

"Blanc-manges may be made by treating peptonized milk in a similar way, and then adding cream. In preparing all these dishes, it is absolutely necessary to complete the operation of peptonizing the gruel or the milk, even to the final boiling, before adding the stiffening ingredient. For if pancreatic extract be allowed to act on the gelatin, the gelatin itself undergoes a process of digestion, and its power of setting on cooling is therefore utterly abolished."

78. *Peptonized Beef-Tea.*—"A pound of thinly-minced lean beef is mixed with a pint of water, and ten grains of bicarbonate of soda are added thereto. The mixture is then simmered for an hour and a half in a covered saucepan. The resulting beef-tea is decanted off into a covered jug. The undissolved beef residue is then beaten up with a spoon into a pulp, and added to the beef-tea in the covered jug. When the mixture has cooled down to about 140° F. (or when it is cool enough to be tolerated in the mouth), a tablespoonful of the liquor pancreaticus is added, and the whole well stirred together. The covered jug is then kept under a 'cosey' for two hours, and agitated occasionally. At the end of this

time the contents of the jug are boiled briskly for two or three minutes and finally strained. The product is then ready for use."

79. *Peptonized Enemata.*—"Pancreatic extract is peculiarly adapted for administration with nutritive enemata. The enema may be prepared in the usual way with a mixture of milk and gruel, or milk, gruel, and beef-tea. A dessertspoonful of liquor pancreaticus is added to it just before administration."—*Sir William Roberts.*

80. *Whey.*—Into warm milk put a sufficient quantity of rennet to cause curdling, and strain off the liquid, which is then ready for use.

81. *White-Wine Whey.*—Boil a pint of milk, and while boiling add two wineglassfuls of sherry. Strain through a fine sieve, and sweeten with sifted sugar.

82. *"Tops and Bottoms" in Milk.*—Over the bread in a basin pour a sufficiency of boiling water to soak it. Let it stand for a minute or two, then strain off the water, sprinkle with a little sugar, and add hot milk.

STERTOR, APOPLEXY,

AND THE MANAGEMENT OF

THE APOPLECTIC STATE.

BY

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STERTOR, APOPLEXY,

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MANAGEMENT OF THE APOPLECTIC STATE.

CHAPTER I.

INTRODUCTION.

STERTOR is the term applied to sounds in the throat, mouth, or any part of the air passages, produced by the movements of the air during respiration, and occurring in the apoplectic and like conditions.

Several varieties of stertor may be recognized, as follows:

1. *Nasal.*—Nasal stertor arises from approximation of the alæ nasi toward the septum by the in-going air, as in the act of sniffing.

2. *Buccal.*—This form of stertor is due to vibrations of the lips and puffings and flappings of the cheeks during inspiration or expiration.

3. *Palatine.*—Arises from vibrations of the soft palate, whether the breath passes through the mouth or the nose.

4. *Pharyngeal.*—Pharyngeal stertor is caused by the lolling back of the base of the tongue into near contact with the posterior wall of the pharynx.

5. *Laryngeal.*—This variety is referable to vibrations of the chordæ vocales.

6. *Mucous.*—Mucous stertor is a term which may be given to the bubbling of air through mucus or fluids in the trachea or larger air tubes.

All sounds of an abnormal character, having their origin in the larynx, trachea, or bronchi, at once give rise, in the professional mind, to a sense of impending danger. It is felt that the life of the patient is in jeopardy from sudden or

more commonly gradual progressive suffocation, ending in death. It is known that some physical changes, intrinsic or extrinsic, have arisen, which have narrowed or diminished the lumen of the chief airways, and the causes of those physical changes are anxiously and carefully sought for, and, if possible, promptly removed. The subsidence of abnormal sounds implies to the anxious physician the absence of at least immediate danger.

This has not until quite recently been our experience with abnormal sounds having their orgin in the nasal, oral, and pharyngeal cavities. In those localities, it is true, they have been observed and noted, and then passed by as of trivial or secondary importance—as having, in fact, no serious bearing on the life or well-being of the patient; but in these portions of the airways, as in those lower down, abnormal sound implies danger, not so immediate perhaps, nor so difficult to combat, but that it is danger as real, and that it requires as much of the intelligent care and skill of the physician, will, I think, in reflection, be readily conceded.

Noise in any part of the airway is a danger signal; its importance the physician must determine. The stertor of the apoplectic state may prove equal in danger to the crowing of the croupy child or the stridor arising from the pressure of a thoracic tumor.

Stertor is therefore a symptom with two meanings—the noise expresses the mechanical interference, and the mechanical interference is an accidental concomitant of the unconsciousness. The accident which determines whether "the stroke" be or be not accompanied by stertor is in most cases due to the accident of the patient's happening or not happening to be on his back; or, should he exhibit stertor while upon his side, there must be some derangement of the ordinary relations of the pharynx, such as the chin being too near the sternum, the existence of a local œdema, long uvula, large tonsils, mucus in the air tubes, pressure from without, or indeed anything which narrows the respiratory channels or vibrates in their course.

To display and make clear the differences which exist in the views entertained by earlier and modern writers and in those advocated in the following pages, it will be well here to present shortly both sides to the reader. For that purpose I

select extracts from the American translation of Dr. Adolf Strumpfel's "Text-book of Medicine," 1887; from Ziemssen's Cyclopædia, under the heading "Cerebral Hemorrhage," by Nothnagel; and from the article Encephale in the "Nouveau Dictionnaire de Médecine et de Chirurgerie Pratique," Tom. XIII. Dr. Strumpfel has labored with great success to bring into concordance pathology and symptomatology—to arrange them as cause and effect; and as his work is now generally accepted as fairly expressing the more modern views in Germany and America on medicine and pathology, I think it best in this introduction, after giving the extracts, to make a general commentary upon his views on the value of the respiratory symptoms in the apoplectic state of cerebral hemorrhage.

He says of the patient,[1] "He usually sinks back in his chair or falls on the floor and becomes deeply comatose. His face is often noticeably flushed, and the pulse full and tense, but not infrequently slow because of the increased cerebral pressure. The respirations are deep, noisy, stertorous, and likewise often slow. The relaxed cheeks and lips are often drawn deeply in at every inspiration and puffed out at very expiration."

Further, on page 690, we read: "A certain number of patients never awake from the initial coma. Death may not be immediate, but they remain completely unconscious; the respiration becomes more rapid and irregular (sometimes of the Cheyne-Stokes character); and there is a rattling in the throat, because mucus and saliva run down into it; the pulse, which was at first retarded, now becomes accelerated; the face becomes paler and more and more sunken; the eyes are deep in their sockets; the cornea becomes opaque; and at last, after the coma has lasted for some hours, or even one or two days, death occurs, often attended by a considerable rise of temperature."

Again, on page 696, under the heading of Treatment: "The treatment of the apoplectic stroke demands, first of all, rest in bed, with the head and shoulders elevated. To avoid bedsores, it is very important to maintain clean linen, and to watch attentively that portion of the skin which is pressed against the bed by the weight of the body. An ice-bag should be put on the head, and particularly over that side on which the hemorrhage is supposed to be. Bleeding was formerly

universally practised, but of late its usefulness is doubted. It is not indicated unless the deep congestion of the face, the violent pulsation of the carotids, and the full slow pulse show increased arterial tension. In such a case, if the patient seems otherwise robust, we may bleed at the commencement of an attack, in the hope of checking the escape of blood by lowering the intra-arterial pressure. In similar conditions, experience shows that the local abstraction of blood from the temples is sometimes advantageous. The bowels should be well emptied by enemata, and later on by drastic purgatives. If the respiration and pulse fail, we may try stimulants (ether, camphor), but very likely they will be without success."

These extracts show that practically Dr. Strumpfel's entire treatment of the apoplectic attack is directed to the relief of arterial tension, and that this tension is believed to have some relation with the deep, noisy, stertorous breathing; but what that relation is, is left to the imagination. It is clear, however, that the means suggested (bleeding) for the relief of the arterial tension is not looked upon as really trustworthy; the writer shows that he has no abiding faith in the means he advises—they are suggestions only; he evidently is not fully satisfied of their end and object. The following pages will demonstrate the fact that the arterial tension has no direct causal relation with the cerebral hemorrhage; on the contrary, it is shown to be entirely indirect, and a consequence simply of an easily removable cause (suffocation) indicated by the stertorous breathing, which, when relieved, so entirely changes the symptoms that the question of bleeding or other depleting remedies cannot even be entertained. I have never failed, during an experience of thirty-five years, to relieve arterial tension in these cases by removing the obstructions which cause the stertor, and by so doing I have at the same time found the nature of the attack to be made more clear, and the management of it more simple and effective.

The first effect of a cerebral hemorrhage is shock, which produces a tendency to syncope; and this state is only changed by the supervention of stertorous, *i.e.*, difficult and suffocative breathing, when the flushed and turgid countenance, pulsating carotids, and strong, bounding pulse at once indicate some powerful reaction. The heart is laboring to overcome some serious obstruction, and it is now obvious enough, from

the distention of the systemic capillaries, that such obstruction can only exist in the pulmonary circulation.

The dyspnœa of stertor may be as great as that of croup, but its effect on the general circulation is somewhat different. There must be some reason why in croup the face is only at first, and exceptionally, flushed, and I think the explanation must be that in croup—certainly in diphtherial croup—the left heart is already enfeebled by the constitutional disease, and has not sufficient of the "*vires vitæ*" to struggle against the difficulties that have arisen. In an apoplexy, on the other hand, the patient may have no febrile or constitutional affection to poison or enfeeble the cardiac muscles, and it is only at a later stage, when the patient becomes exhausted, that the flush gives rise to the sallow appearance generally noticed.

Ziemssen says:[2] "The other features of the attack, the appearance of the face, the condition of the pupils, the respiration, the pulse, are also subject to manifold variations.

"The color of the face is sometimes deep red, even slightly cyanotic, the latter indicating an irregular and impeded circulation; at other times it is entirely normal, and again in other cases it is found to be quite pale, resembling in every particular that of a person in a faint. This last appearance seems to occur with special frequency in cases here the hemorrhage has taken place gradually. Sometimes in the very beginning of the attack, before consciousness is lost, the patients look pale, with sunken features, and they then, as a rule, suffer from nausea and vomiting.

"The character of the pulse also varies with the case. The so-called pulsus cerebralis of the older physicians, *i.e.*, a slow, sometimes also an irregular, pulse, is, to be sure, the variety most often observed; but sometimes, on the contrary, it is very rapid and entirely irregular. The tension is equally subject to variation. The respiration is in many cases quiet, and as regular as that of a person in sleep. Our fathers used to describe a noisy, snoring, "stertorous" respiration as peculiar to hemorrhagic apoplexy; but, as just stated, it is not universally present, and is, moreover, met with in sopor due to other causes. In cases of very deep unconsciousness, the cheeks are drawn in during inspiration and puffed out during expiration (the so-called tobacco-smokers' respiration). Traube was the first to call attention to the phenomena of the Cheyne-Stokes

respiration in cerebral hemorrhage, and we are able to confirm his statements. If the patients do not awake from their coma, the respirations become toward the end intermittent and irregular."[3]

Again, on page 107: "Death takes place usually in connection with symptoms which point to paralysis by pressure of the spinal centre of the vagus nerve (irregular, faltering respiration, intermission and weakness of the pulse), or, in case the coma is of longer duration, also in consequence of œdema of the lungs, or of pneumonia. It has been practically found that recovery rarely takes place after the coma has lasted forty-eight hours."

At page 108: "After injuries of the medulla oblongata, œdema of the lungs was especially apt to occur."

At page 140, in speaking of hemorrhage into the pons Varolii: "Finally, pronounced disturbances of the respiration are sometimes met with, such as marked stertor, cyanosis, intermittent breathing, and occasionally excessive dyspnœa."

Under Treatment we find the following (p. 162): "In case, namely, the extravasation has caused an increase of the intracranial pressure, and that in consequence of this, together with the cerebral hyperæmia which accompanies it, a paralysis of the respiratory or vagus centre is threatened, the rapid reduction of the quantity of the circulating blood—for it is impossible to act directly on the extravasation—may, by diminishing the pressure, have the effect of actually prolonging life; and this indication can only be fulfilled by venesection."

"The explanation of venesection, as first described, is in harmony with the observed fact that patients have sometimes been roused by its aid from a state of coma. A beneficial effect may be looked for from venesection in cases where apoplexy is accompanied by well-marked symptoms of cerebral hyperæmia, such as turgid face, with, perhaps, distended veins and increased pulsation of the carotids; where the action of the heart is powerful, the radial artery of at least normal tension, the pulse slow, or regular and of normal frequency; where the respiration is uniform, quiet, and of snorting character; when the patient is strong and of not too advanced age. Supposing these conditions to be present, we regard venesection as indicated if cerebral pressure, already considerable, has begun to cause paralysis of the vagus centre (Cheyne-Stokes

respiration). At any rate, through the use of this measure, combined with stimulant remedies, life may still be preserved in a certain fraction of these cases."

"The large percentage of deaths from apoplexy proves how fruitless is often the most careful and best considered treatment; and when it is remembered, furthermore, how frequently patients recover spontaneously from the attack, it seems fair to raise the question whether efforts such as those described, or medical interference of any kind, are ever of value."[4]

Continuing his argument he says: "It would be difficult to convince a determined sceptic that such is the case; but the affirmative view gains a certain degree of probability through the fact mentioned above, that venesection is often immediately followed by return of consciousness. This being taken into consideration, and, in addition, the fact that the efficiency of the remedies in question, if it cannot be proved, is not to be disproved, and that without them we have no treatment left, we should, in our opinion, continue to employ them, and that, too, not simply from a humanitarian regard for the friends of the patient."

Nothnagel, then, confirms and maintains the doctrine of our fathers, that in true apoplexy—shock, loss of conciousness, and paralysis—there are two forms, sthenic and asthenic: the former distinguished by flushed and turgid face, pulsating carotids, an excited, laboring heart, increased arterial tension, and noisy respiration, which, he leaves us to imply, is always an attendant on the sthenic variety; the latter, by a pale face, feeble pulse, feeble cardiac action, and, although he does not specifically say so, no noisy respiration, but a breathing in many cases as quiet and as regular as that of a person in sleep. In the former he recommends bleeding, not because he can fully explain its influence, but that "venesection is often followed by a return of consciousness." In the asthenic variety, of course, he does not mention it, as there is so palpably no indication for its employment. He says that it relieves intra-cranial pressure, and, when used in such cases of the sthenic variety as he describes, no doubt when blood is let freely it would do so, and one can readily conceive in what way. The respiration being obstructed, the jugulars have become gorged, the blood is prevented from leaving the intra-

cranial cavity, and the oppression of the cerebral functions becomes more and more marked. To suddenly relieve this may, and probably often does, relieve the parts of the brain concerned indirectly with the causes of stertor; the stertor being silenced implies free respiration and free circulation, and therefore entire relief from that intra-cranial pressure which Nothnagel says indicates the necessity for bleeding. It is therefore the suffocative symptoms which are relieved by bleeding, the very symptoms which can so easily be relieved by simpler and more harmless means.

The following extracts express very clearly the views generally entertained by modern French physicians:[5]

Page 120: "The face is sometimes injected and puffy, sometimes very pale; the aspect is expressionless; the flabby cheeks are puffed out synchronously with each expiration. Deglutition is often difficult, the reflex of the velum palati and pharynx is enfeebled or lost; liquids find their way more or less into the air passages and give rise to cough; respiration is sometimes accelerated, sometimes retarded; hæmatosis is incompletely performed; the face and extremities are cyanosed. The patient makes no effort to get rid of the mucus which accumulates in the trachea and bronchi, and the air inspired makes a special noise in passing it, which we call stertor. The pulse is often infrequent in consequence of irritation of the medulla; later it becomes more frequent, smaller, and irregular."

Page 121: "When the attack is fatal, the patient remains comatose, or falls again into that conditions after having given some signs of consciousness; the respiration becomes more and more labored, the pulse small and irregular, and death supervenes, either with the phenomena of asphyxia or from syncope. Sometimes, at the moment that the coma begins to pass off, another attack occurs. The comatose condition may be prolonged for several days ere terminating in death, but the patient generally succumbs within forty-eight hours. Death is never sudden, save in the case of hemorrhage into the medulla."

Page 129: "*Treatment.*—Against the lesion itself nothing is of any avail. The vessel once ruptured, the hemorrhage necessarily follows without our being able to arrest its progress. The treatment, then, ought from the commencement to

be exclusively directed against functional troubles, and above all against paralysis of the encephalon. Every effort of the physician should aim at arousing the excitability of the nerve tissue. Bleeding constitutes—when the general state of the patient permits of it—the most efficacious means. It diminishes the intra-cranial pressure, arouses circulation in the encephalon, and combats the hyperæmia which sometimes complicates hemorrhage and tends to maintain the neurolysis. But if blood-letting is of real service in certain cases, it is in others strongly contra-indicated, and it cannot therefore be practised indifferently in all cases of apoplexy without danger."

Page 129: "In the treatment of apoplexy it is necessary, above all, to be guided by the general condition. When the patient is young, robust, the pulse full and bounding, the cardiac impulse powerful, then *la saignée générale* is strongly indicated. Bleeding from the arm is to be preferred. The vein should be opened boldly, so as to obtain a rapid depletion of the circulation. The relief is in certain cases almost immediate, and patients are even seen to regain consciousness during the operation" (Jaccoud and Hallopeau).

The foregoing views are so similar to those extracted from the German authors that it would be needless repetition to make a further analysis of the preceding extracts; what I have already said need not here be repeated.

The following papers are so arranged as to illustrate the progressive stages of the inquiry, and cases are related to illustrate every phase of respiratory difficulty in the apolpectic and allied conditions. Cases in which the principles seemed contradicted by experience are especially introduced, and the causes of the apparent contradictions commented on and explained. Each case was most carefully watched and noted, and its management carried out with as much scientific precision as possible. Failures are as rigidly recorded as successes, so that each case may be regarded as a scientific experiment, and, as far as it goes, perfectly trustworthy.

The conditions allied to the apoplectic state—*i.e.*, those in which from any cause the mind and will are in abeyance, and the body is left in that state of physical helplessness in which the functions necessary to the maintenance of life become endangered by forces acting from within and without—are re-

lated under their respective headings—concussion and fracture of the skull, drowning, chloroform-poisoning, convulsions, epilepsy, bronchitis, and so on. Each condition is shortly illustrated by typical cases, in order to demonstrate the varied applications of the principles contended for. The subject of drowning has been more fully dealt with in my paper read before the Medical and Chirurgical Society on May 28th, 1889, and subsequently published in the Transactions of that Society, Vol. LXXII. The paper on "Stertor in Animals," read at the Glasgow meeting of the British Medical Association in August, 1888, will be of interest, as part of the general subject, and as again illustrative of the proper management of the apoplectic condition.

The paper on the "Mammalian Pharynx"[6] I have also included in this work, as it illustrates changes in the form and position of the epiglottis, and its relations with other parts at different ages, and thus applies in many ways to the subject under consideration, and helps to form a more or less complete study and exposition of the subject of stertor.

As an appendix I have thought it well to republish my original letter to Dr. Marshall Hall, which he forwarded to the "Lancet" of 1857 and subsequently published in his work on drowning, as it contains the dissections and experiments on which my principles are founded. The experiments may appear to have been somewhat roughly done, but they were conducted under many difficulties, and were honestly reported. My many years of subsequent experience have shown them to have been sufficiently exact as a helpful guide in practice, and that there was no error in principles which needed correction.

Quite early in my investigations I entertained the conviction that, by separating the suffocative symptoms from the shock of apoplexy, we should so simplify the case as to enable us to mark the position and probable extent of the cerebral mischief. As I have watched progressive steps in the localization of brain functions I have become more and more convinced of the practical value of removing the mystifying symptoms of suffocative stertor as an essential element of diagnosis and prognosis, quite independent of the frequent and valuable aid afforded in the final recovery of the stricken and suffering patient.

It may be asked whether in any case bleeding is justifiable

in apoplexy. A wider knowledge of pathology has taught us that the short-necked, fresh-colored, plethoric-looking man is not the individual most liable to a "stroke." It is probable that the ordinary appearance of a man in the apoplectic state, with the presence of stertor and suffocative symptoms, and therefore with congested and turgid countenance, may have led to the error of labelling the plethoric-looking man with the prefix "apoplectic." Of course such a man may have a stroke, and it is possible that under certain conditions blood-letting may become a question of treatment in the case; but my experience teaches me that even in such constitutions, if no stertor exists, and there are no impediments to the free entrance of air into the lungs, the propriety of "letting blood" has never appeared to be necessary or justifiable; the stroke has, through "shock," acted sufficiently as a sedative, and removed all traces of bounding pulse and arterial tension.

It is conceivable that the circulatory centre may be in some cases fretted by poisoned or disordered blood, and that arterial excitability and tension may result, even without obstruction in the airway; if so, of course blood-letting may be useful and permissible; but in apoplexy, as I have before stated, I have never seen such a necessity.

CHAPTER II.

OBSERVATIONS ON STERTOR, AND THE VARYING CONDITIONS ON WHICH IT IS DEPENDENT.[7]

In order to make my subject clear I am necessarily led to speak of obstructions about the throat in connection with stertor; how far these obstructions are due to the position of the body; and how they may be removed by altering that position.

The cause of the loud and deep sound in the throat to which the name "stertor" has been applied does not appear to have received the attention it deserves. From numerous experiments I have arrived at the conclusion that in the majority of instances it arises from one of three conditions—from paralysis of the velum palati; from the paralyzed tongue falling back in the throat; and from the presence of mucus in the pharynx and air passages.

In the winter of 1855 and 1856 I was engaged, in conjunction with Dr. Edward Long Fox, of Bristol, and Mr. Charles Hunter, of Wilton Place, upon some experiments for the late Dr. Marshall Hall, to determine the amount of air which could be respired in the dead subject by compression and relaxation of the chest (see Chapter VIII.). In attempting this we repeatedly found that at one time compression failed to expel any air from the chest, and at another, after air had been expelled, it would not re-enter on removing the pressure. On opening the mouth and searching for a cause, it was found that the tongue had fallen back and blocked up the cavity of the pharynx. The tongue was accordingly drawn forward and fixed between the incisor teeth, but still we found that on one body the experiment succeeded well in producing respiration, on another it failed. This time the tongue was no obstacle, but the pressure on the chest and abdomen had thrown up some of the contents of the stomach into the pharynx, which entirely prevented the current of air from passing into

or cut of the chest. This induced us to try to produce respiration in such positions that anything in the pharynx would fall from rather than toward its posterior wall; the consequence was that we obtained the most invariable and favorable results by the method of artificial respiration now known as that of Marshall Hall.

In a paper communicated to the Medical Society of St. George's Hospital in 1856 great stress was laid on the influence of the position of the body over the tongue in the half-drowned patient; and it was pointed out how necessary it became to pay the greatest attention to a fact which at first sight appeared of little importance. Subsequent to the meeting I received from Mr. Harvey, one of the members of the Society, a letter on the subject, of which the following is an extract:

"I am glad to find you lay so much stress on the tongue's position producing apnœa in persons that have been rendered insensible. One of the first persons I ever saw on the operating-table nearly died from this cause during the operation, under the influence of chloroform. Mr. Syme, who was operating, fortunately guessed what was the cause of the sudden asphyxia, and drew the tongue forward with a pair of forceps, and the patient presently recovered."

Mr. Harvey's case strikingly illustrates that the tongue may be a cause of apnœa in other circumstances than those of drowning.

The following cases illustrate another phase of this subject:

Case I.—In November, 1857, I was called to see an old lady who had been attacked with sudden sickness while talking to some friends; faintness followed, with an inability to express herself, though she was to a considerable extent conscious. She was put to bed and kept quiet; mustard poultices were applied to the epigastrium and nape of neck, and hot bottles to the feet. In an hour or two reaction commenced, and, *pari passu*, coma and stertorous breathing set in, which steadily increased in intensity until my second visit, when this condition had lasted about three hours. Her pulse was now full and excited, but, as she was seventy-three years of age, and had already suffered from two or three attacks of paralysis, no severe measures were adopted. The skin was hot and

covered with a profuse perspiration; the face was swollen and livid, and the mouth half open; the pupils were contracted and insensible to light, and the eyeball to touch. The stertor was very deep and the breathing labored. While I was at the bedside of my patient she was very nearly suffocated, from the stomach ejecting a portion of its contents into the throat. I at once turned her on her side and emptied her mouth, when she not only breathed freely, but without the slightest stertor. I was somewhat surprised, but proceeded to place her in what appeared to be the most comfortable position, on her back. Immediately when I did so her respiration suddenly ceased and she convulsively struggled for breath. Supposing it to be the tongue which had choked her, I thrust my finger into the mouth and pressed it forward, when the breathing again became easy and free from stertor. The patient was now comfortably laid on her side, and until her death, which took place two days afterward, the stertor never recurred when she was in that position, but the respiration continued as naturally as if she slept. To convince myself that this was due to position, I several times turned her on her back for a few moments, and invariably when I did so the stertor was as marked as ever. The lateral position had another advantage, for it allowed the saliva and mucus to drain away instead of remaining in the bronchial tubes and giving rise to "mucous stertor," and thus offering another impediment to the respiration. Other changes occurred coincidently with the change of position, but how far they depended upon it future experience must decide—the pulse became calmer; the skin cooler and less bedewed with moisture; the eye insensible to the touch; and general sensation returned to such an extent that the patient evinced signs of discomfort at the removal of a mustard poultice. Nevertheless, whenever the supine position was adopted, the stertor, difficulty of breathing, lividity of face, and other unfavorable symptoms returned in full force. It was easy to observe that, as the position was changed, the paralyzed tongue gravitated downward.

This case suggests many important points for consideration:—1. That the paralyzed tongue may, under certain circumstances, cause even death by suffocation; for I believe this

patient would have died if I had not been present when the tongue fell so suddenly back and when the fluid was ejected from the stomach into the throat. 2. That stertor arises from the tongue falling back in the supine position of the body, thus offering a serious impediment to the respiration, since it required greater muscular force to breathe with stertor than when the respiration was noiseless. 3. The mucus (another respiratory impediment) drained away when the patient was on her side. 4. The great improvement of the general symptoms occurring upon the establishment of easy breathing in the lateral position, and pulse, skin, sensation, all undergoing material alterations for the better.

Case II.—G. T——, a gentleman sixty-five years of age, became comatose from exhaustion supervening upon extensive subacute inflammation of emphysematous lungs. When I entered the room he was lying on his back, with his mouth open, breathing stertorously, though not to a great extent. On looking into the mouth, the soft palate appeared remarkably small and shrivelled, so that it did not come very decidedly in contact with the tongue, even though partially paralyzed. While I was standing at the bedside my patient suddenly ceased to breathe, became very livid in the face, struggled convulsively, and then became rigid. My recollection of the first case induced me to turn this patient on his side, when he instantly recovered with a long groan, and then breathed quite naturally. He was turned on his back again; stertor returned, and he became choked from a quantity of bronchial secretion. The lateral position was resumed, the sputa drained away, and he now breathed quite easily until his death, which took place about half an hour afterward.

Case III.—H. J. L——, a clergyman about sixty years of age, subject to slight epileptic seizures twice a year, was seized, on May 4th, 1858, at ten in the morning, with a fit of the usual character. The attack commenced with a scream, and lasted but a few minutes, though the patient was some time before he fully recovered. At eight o'clock in the evening of the same day he was again attacked while walking across the hall of the hotel at which he was staying. When I arrived about ten minutes afterward I found him lying on his back, with a deep cut over the left eye, breathing stertor-

ously and with much labor. The mouth was open, the face highly congested, the skin hot and perspiring, and the pulse full and sharp, but not accelerated. He was quite insensible to external impressions. He was turned on his side sufficiently for the tongue to fall forward; the stertor instantly gave place to easy, natural breathing; the congestion of the countenance gradually disappeared, and in less than one minute he began to evince signs of recovery, and almost as quickly the pulse became weak and small and the skin cool. He went to sleep for a few minutes, and on awakening was rendered almost frantic by pain in his head. From this he slowly recovered, and in a few days was convalescent. I should mention that there was a loud bruit at the apex of the heart, and that a small pulse was common to him.

Case II. merely gave further evidence of the danger of the supine position of the body from paralysis of the tongue and the accumulating bronchial secretion; but in Case III. it would appear that the change of position was in some measure the cause of his speedy recovery. In this case, too, as in Case I., the skin and pulse altered in character as the stertor ceased. It is in such a case as this that I can imagine "position" to be a curative as well as a palliative measure. Here was a delicate man, subject to epilepsy and disease of the mitral valves. Supposing the breathing to have gone on with great labor and the lungs to have become more and more congested, and consequently the brain and heart also, one or other or both of these vital organs might have suffered and death ensued.

Case IV.—Mrs. P——, æt. 46, after suffering twelve days from continued fever, was seized on the evening of August 27th, 1858, with a severe rigor, which was soon followed by what was supposed to have been a very deep sleep. I was called to see her at two in the morning of the 28th, when I found her lying upon her side, in a state of deep coma, with her mouth half open. There was no stertor; the skin was warm and bedewed with moisture, and the pulse was almost imperceptible. I endeavored to administer a little stimulant, and for that purpose turned the face upward, when I soon perceived a harshness in the breathing, from obstruction in

the back of the throat. By allowing the head to remain in this position a few minutes the obstruction became greater at each inspiration, and stertor was the result. A little fluid was now introduced into the mouth with a teaspoon, which almost choked my patient; but, on turning her on her side again, the fluid drained away and the stertor ceased. In about an hour afterward she sank. So prostrate was this poor woman from fever that I believe, had much effort been required to overcome the impediment to the respiration, from the time coma first set in, she would not have survived as long as she did.

Besides the cases now related, a medical friend informs me that on my suggestion he adopted the lateral position in a case of stertor from apoplexy, and that the stertor immediately ceased. The man was bled, and soon recovered from the comatose condition. My friend also adopted this method with a child suffering from convulsions. When he first saw the child it was frothing at the mouth, and the respiration seemed much impeded. He turned it on its side, and before he had time to apply other remedies the child began to evince signs of recovery. I do not assume in these cases, or in Case III., that change of position was the cause of recovery; it may have assisted to produce the happy result, or it may merely have been a coincidence. I simply state the facts as they occurred, and avoid inductions for the present.

Meanwhile I propose roughly to consider the anatomy of the parts concerned in stertor, and to show how and why stertor is the consequence of the supine position of the body, and why it differs in character in different cases. I must also relate a few experiments undertaken with the object of further illustrating the views herein entertained.

It is well known that the cavity of the pharynx, having a fixed boundary only posteriorly, may have its capacity materially affected by the ever-varying position of its sides, of the soft palate, the tongue, and the larynx. The larynx and sides of the pharynx have, I believe, little connection with the cause of stertor. I shall therefore not further refer to them. The tongue, being attached to the lower jaw by its mucous membrane and its muscles, has its relations with surrounding parts altered as the mouth is opened or closed.

When the mouth is closed, the horizontal portion or body

of the jaw forms nearly a right angle with the spinal column, from which the symphysis is then at its greatest distance. When the mouth is opened by the dropping of the jaw, the symphysis describes the arc of a circle, and approaches more nearly to the spine, where the posterior wall of the pharynx is attached (Figs. 1, 2, and 3). The tongue, having its chief attachment to the symphysis, would consequently be drawn away from the pharynx in the former case, and allowed to rest in contact with it in the latter. This, if not true in every

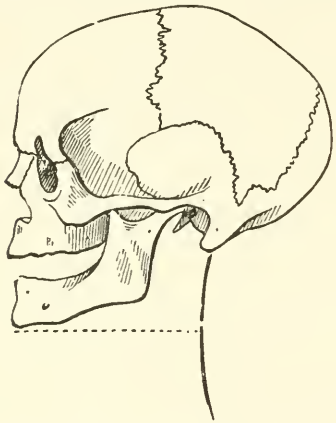

Fig. 1.—Diagram to show space between Symphysis and Vertebral Column with Mouth Shut.

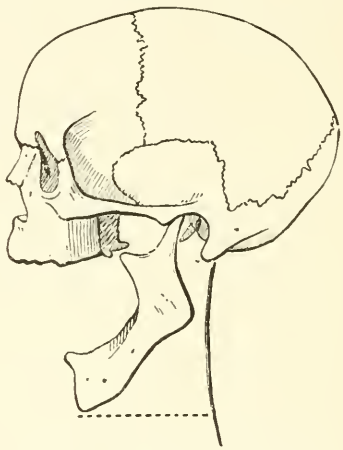

Fig. 2.—Diagram to show space between Symphysis and Vertebral Column with Mouth Open.

N.B.—The line representing the spine should, in both diagrams, have been placed more forward; *i.e.*, in front of the mastoid process.

case, is at least true in some, as the plate demonstrates (see Fig. 4).

The dissection from which the drawing was taken was made with great care, so as not to displace the parts more than was necessary to give a fair view of the base of the tongue and the epiglottis. The two sketches with the open and closed mouth were kindly taken for me on the spot by my friend Dr. Fitzgerald, and they very accurately represent the parts as they appeared at the time. When the mouth was open and the subject on its back, the road to the larynx was completely obstructed, in consequence of the tongue resting in contact with the back of the pharynx; but the obstruction could be removed by hooking the tongue forward. When

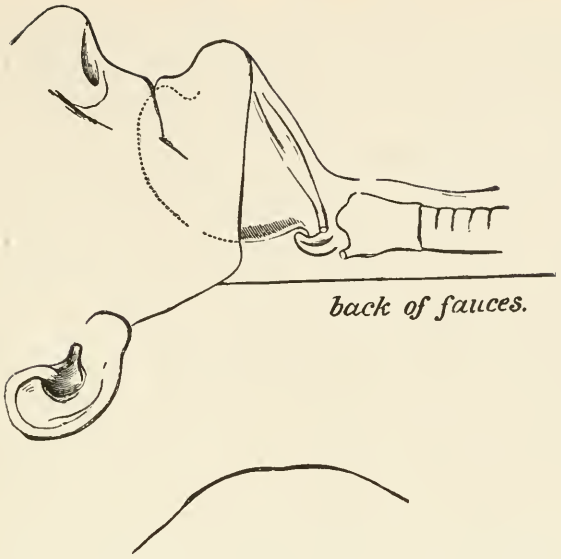

Fig. 3.—Showing the position of the tongue with the mouth closed.

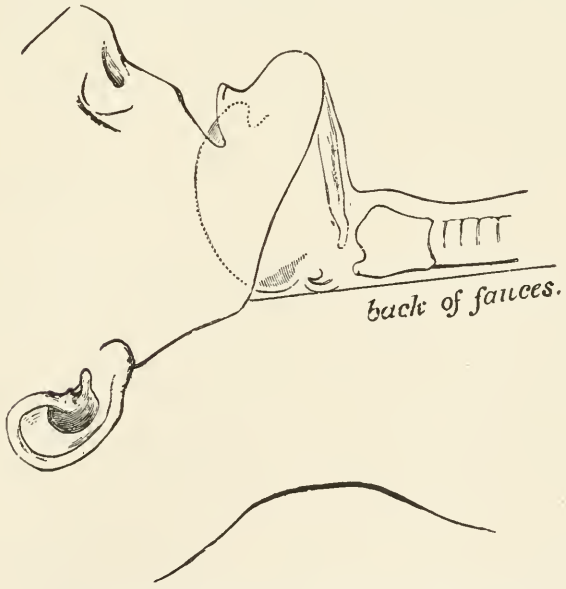

Fig. 4.—Showing the position of the tongue with the mouth open.

The dissection from which the drawings were taken was made on the body of a woman, æt. 60, who died of cancer of the uterus. Great care was taken not to displace the parts more than was necessary to give a fair view of the base of the tongue and epiglottis. The sketches were taken with the subject lying on its back on the table.

the mouth was closed, the tongue was lifted from the pharynx, leaving ample breathing space. But even with the closed mouth, if the chin was much bent on the sternum, the base of the tongue was almost in contact with the back of the pharynx.

It would seem from this dissection that the muscles of the tongue attaching it to the symphysis of the jaw are too short to admit of the base of the tongue reaching the back of the throat when the mouth is closed. The purpose served by such an arrangement would appear to be to keep the base of the tongue away from the back of the throat during deglutition. In the act of deglutition the mouth is firmly closed, and the genio-hyoid and genio-hyo-glossi muscles, taking their fixed point from the now immovable symphysis, draw the body of the tongue upward and forward, allowing sufficient room for the morsel of food to travel easily through the cavity of the pharynx. Were these muscles of greater length, the base of the tongue might become a source of inconvenience, if not of danger. The dissection, besides demonstrating the respective positions of the tongue with the open and closed mouth, suggests the necessity of caution being used in raising the head with pillows: for if the head be too much bent forward on the chest, the tongue may lie in dangerous proximity to the pharynx even when the mouth is closed.

The Different Characters of Stertor.

From having observed the snoring of sleep sometimes take place through the nostrils with the closed mouth, and sometimes through the open mouth, and having also observed differences in the apoplectic stertor, I endeavored to analyze the particular cause of each of these varieties by some experiments on myself and by clinical observation.

I placed myself as nearly as possible in the condition of an apoplectic patient, by paralyzing my tongue, or rather by allowing it to assume its own position by gravitation. After a little practice and with some care I succeeded in effecting this, and found: 1. That it required much more voluntary effort to snore through the nose and breathe stertorously through the mouth in the upright and prone positions than in the recumbent and supine, and that the greatest impediment to the respiration occurs when the jaw is dropped and the mouth

most widely open. 2. The deep, vibrating snore of sleep, with the closed mouth, depends upon the tongue pressing the velum palati upward and backward, thus narrowing the opening between the nose and pharynx, the velum vibrating as the air rushes through. Sometimes, when the mouth is partially open, the soft palate drops upon the tongue, and vibrates as the air rushes between it and the tongue. To either of these noises in which the soft palate is concerned I propose, for the sake of distinction, to apply the name of "palatine stertor." 3. The harsh, sharp, husky noise occurring in apoplexy, with the mouth wide open, always arises low down in the pharynx, and depends upon the narrowing of the passage between its posterior wall and the base of the tongue. By holding a looking-glass before the face while producing this noise, it can readily be seen that the soft palate is in no way concerned in it. In all the cases recorded in this paper this was the nature of the stertor which existed, and as it arises solely in the pharynx I have given it the name of "pharyngeal stertor." 4. There is a variety of stertor in apoplexy which may be named "mucous stertor," as it depends upon the presence of mucus in the bronchial tube. So common is this, either alone or in combination with one or other of the preceding varieties, that in "Hooper's Medical Lexicon" it is stated that "apoplectic stertor appears to depend upon the presence of mucus in the air-tubes," as though it were always the cause.

Of these three different varieties of stertor, that which is named pharyngeal is far the most dangerous, for the greater the paralysis the more effectually does the tongue block up the passage, and each inspiration only adds to the distress by sucking the tongue lower down into the pharynx. Its danger is, however, not due alone to the gradual impediment it offers to the respiration, but also to the fact that at any moment this impediment may be absolute and cause death by suffocation. This has been before referred to in the remarks upon Case I.

We may observe a similar example in the snoring sleeper, who, after drawing several inspirations with evident effort, at last comes to a sudden check from having been gagged by the tongue falling back. This will rouse him from his stupor, and he will then sleep on quietly until the same thing recurs from his deepening sleep.

This subject gave rise in my mind to the question, Is the breathing in deep coma invariably carried on through the mouth? I once thought that such was the case. In the four cases related it was so, as well as in some cases of apoplexy which I witnessed at a former period. But the following case is one in which the breathing was carried on through the nostrils.

Case V.—W. B——, æt. 41, had suffered for two years from numbness and tingling of the extremities of the right side, and was now (August 20th, 1858) under treatment for a supposed commencing disease of the retina. He has been suffering much from anxiety for some time past, and was unusually drowsy in the daytime. On August 20th, after eating a hearty breakfast, he was seized with paralysis of the right side. When I arrived he was able to speak indistinctly, though not to make use of the words he wished. The face was drawn to the left side, and the tongue pushed to the right when protruded; the pupils were natural. In a few minutes he ejected a large quantity of food from his stomach, and became covered with perspiration. He was conveyed to bed, but before he could be undressed he was partially sick several times. He soon commenced snoring with his mouth closed, and was now unable to answer questions; his pulse was soft and feeble and his skin clammy. I turned him on his side, and, though the snoring altered in character, it did not cease, but the impediment to the breathing was less. The mouth was firmly closed, but by means of a spoon I was able to open it slightly, and found the tongue in contact with the incisor teeth and closely applied to the palate. By introducing the spoon farther into the mouth, and pressing on the tongue, all snoring at once ceased; when, however, the mouth was allowed to close, it continued as before. Medicines could not be swallowed, and in about half an hour he breathed his last, quietly and without a struggle.

Remarks.—Snoring in this case continued even in the lateral position. The spasmodic closure of the jaw had pressed the tongue upward and backward, carrying with it the soft palate. The snoring was, however, soft and slight, and was but a very partial impediment to the respiration.

But I am inclined to believe that the peculiar apoplectic

condition giving rise to spasmodic closure of the jaw and "palatine stertor" is exceptional; and that the proposition that "it is the rule for persons in coma to breathe through the mouth" is a true one, and for this reason: the muscles of the jaw being paralyzed, the jaw drops and opens the mouth; whereas the dilators of the nostrils being also paralyzed, the alæ nasi are forcibly drawn by the in-going air toward the column of the nose, and thus close the orifice of the nares altogether. This can be illustrated by the act of "sniffing"; but the following is a case in point:

While watching the dying moments of a poor man who was comatose from hemorrhage from an ulcer of the stomach, I observed that he breathed with evident and increasing effort, from the alæ nasi flapping toward the centre column during inspiration. With my fingers I kept the nares freely opened, and the breathing became so easy that I have reason to think that his life was prolonged for some little time by these means.

General Reflections.

Having now given in detail what evidence I possess in favor of the foregoing views on "stertor" and the "influence of position in certain morbid conditions of the system," I have to add a few remarks on the cases to which this subject appears to apply, and more particularly in reference to apoplexy and its treatment.

Since the days of Abercrombie so much light has been thrown on the different causes of apoplexy that his division of the primarily apoplectic (where no apparent change had taken place in the brain) may be broken up into several subdivisions. It is now fully acknowledged that many of these cases depend primarily on some disease of the heart or its valves, upon aneurism, upon atheroma, upon engorgement of the pulmonic circulation, and upon uræmia. Consequent upon these great advances in pathology is a total change of treatment, for it is but seldom that we now hear of that indiscriminate and enormous blood-letting which is detailed in Dr. Abercrombie's work on diseases of the brain. In his time, age, sex, or condition had little influence over treatment; so long as apoplexy existed, blood-letting was considered the chief, almost the only, remedy.

Since, then, it is admitted that apoplexy may result (and very commonly does result) from an alteration in the state of the general circulation, I conceive that anything which would mischievously affect the circulation during the apoplectic attack would militate very considerably against the chance of the patient's final recovery. Let me suppose a case. A man with disease of the heart or large vessels, on making some unusual effort, falls down in a fit; he is taken up and laid on his back in bed. Stertor at once commences; if it be not relieved the respiration becomes impeded, congestion of the lungs takes place, then of the right side of the heart, then of the jugulars and of the brain.[8] And now another direct source of apoplexy exists—increased congestion of the brain, and this, too, with unaërated blood, itself a poison sufficient to destroy life. As long, then, as the stertor is allowed to continue, the mischief increases, and remedies will be of little avail. But suppose that when the man is taken up in a fit of apoplexy he is laid in such a position that his respiration cannot be impeded; that the blood may flow steadily on in its course; that he is placed in such a position in short, that nature will meet with no impediment in her attempt to right the temporary disturbance which a sudden effort brought about. Then, I think, we may fairly hope for a better issue, if judicious aid be afforded by means which the urgency of the case may render necessary. This especially applies to cases of congestion dependent upon or complicated with atheroma; the danger would then be doubly great, for the increased congestion might be more than the diseased cerebral vessels could bear; they might give way, and the case would become one of sanguineous apoplexy.

In the second class of cases of Dr. Abercrombie (those not primarily apoplectic), where the symptoms depend upon an effusion of blood in the brain, if there be any hope, it must at once be forfeited if the respiration be impeded, since this would increase the congestion of the cerebral vessels and cause the blood to make its way out of those which were ruptured, with greater force. The same would apply to laceration of any of the sinuses or vessels of the brain from fracture of the skull. I remember to have seen a boy, who had fallen from a bridge, brought home in a state of syncope. Extensive simple fracture of the vault of the skull was detected. He

was laid on his back on a table, and as reaction commenced he fell into a state of coma, with stertorous breathing. In a short time the symptoms became so urgent that trephining was performed, whereupon a large quantity of blood made its escape with considerable force. The boy was relieved, but died three weeks afterward.

On examination after death, there was found a large quantity of clotted and fluid blood on the surface of the brain, the superior longitudinal sinus was lacerated, and the substance of the brain much injured.

In a case of this kind, to impede the onward current of blood through the jugulars must be the first step toward death, for the blood would make its way where there was least resistance, through the wound of the sinus. If, however, there were no obstruction in its natural course, we may fairly presume that it would follow that rather than turn aside through an opening in which perhaps a coagulum had already formed.

Such, then, are the dangers which may result from a persistence of stertor in apoplectic and similar conditions; but there remain the other and more immediate dangers of the supine position:—1. Fluids or other foreign matters may make their way into the larynx from the mouth or the stomach. This I had repeated opportunities of observing in the dead subject when engaged on experiments for the late Dr. Marshall Hall; but that it is a real danger in the living man is placed beyond doubt by a remarkable case which is related in the "Medical Times" of April 23d as having been under the care of Dr. Bristowe. A drunken man died from symptoms of suffocation. At the autopsy some of the contents of the stomach were found in the bronchial tubes. Further, my friend Mr. Bateman, of Folkestone, informs me that during his attendance on a case of delirium tremens the patient, in an attack of vomiting, became suddenly asphyxiated and died. No post-mortem examination was made, but it seemed probable that some foreign matter had entered the larynx, and caused spasm of the glottis, and death. 2. The falling back of the tongue, causing sudden and complete apnœa. This may occur in all cases of paralysis, whether from syncope, apoplexy, concussion of the brain, chloroform-poisoning, suffocation from carbonic acid, or drowning. I have seen imminent

danger from this cause, but am unable to record a death arising from it, though this may be a more common occurrence than we are at present aware of; for if a disaster arise from any of the above causes, the patient is, I believe, invariably laid flat on the back.

As an appendix to this subject, and in conclusion, it will be interesting to relate the following case, which has recently been forwarded me by Dr. Lewis (medical superintendent of the Cheshire and Chester Lunatic Asylum), to whom I wrote many months ago on this subject:

"Seth Yarwood, a man with a very peculiar formation of head, the subject of ambitious monomania of two and a half years' standing. He first had an epileptic fit, which was of a very severe character, on the 21st of November, 1858, and another on the 10th of December following. They did not recur until June 3d of the present year (1859), when he had one; and two more, one on the 8th and one on the 10th of July.

"On the 10th of August, at 4 P.M., he had four fits, of a very severe nature, in quick succession, three occurring in less than five minutes and the fourth in about a quarter of an hour. When seen, he was in a state of profound coma, pupils contracted, and insensible; pulse small, weak, and irregular; surface pale, with cold, clammy perspiration; breathing irregular, slow, and extremely laborious. The stertor was very marked; very little air seemed to pass into the lungs; the cheeks were puffed out during expiration. He was placed well over on his side, and propped up so that he remained about half way between the lateral and prone positions. There was an immediate flow of saliva from the mouth, and this was followed by a considerable quantity of sanio-mucous fluid. The breathing instantly became more free, and in less than a minute all stertor had ceased; the other symptoms gradually subsided, and in an hour's time, the bowels having been freely acted on by two drops of croton oil, there was a partial return of consciousness. The next morning he refused to stay in bed, and, though dull and stupid, was moving about more or less all day."

Remarks.—The symptoms at the time were considered as rendering a fatal termination more than probable; whether such was really the case is immaterial. The sudden subsid-

ence of the symptoms on the change of posture must, I think, indisputably prove that the cerebral congestion was relieved by it; and, further, we may conclude that the change in posture rendered a fatal termination less probable than if posture had not been attended to.

CHAPTER III.

STERTOR (Continued), WITH ILLUSTRATIVE CASES.[9]

Since the publication of the foregoing paper, if I except a paragraph in the article "Chloroform" in Holmes's "System of Surgery," I know of nothing which has been contributed to medical literature on the subject of stertor.

In my first paper only three forms of stertor are defined—palatine, pharyngeal, and mucous stertor. Professor Lister refers to a "laryngeal stertor" as occurring during a certain stage of the inhalation of chloroform, but as it has no practical connection, so far as I am aware, with the apoplectic and its allied conditions, we will at present dismiss it from further consideration.

The forms of stertor, then, which have a direct connection with the apoplectic state are: The palatine, arising from the vibrations of the soft palate; the pharyngeal, from the gravitation of the tongue into the back of the pharynx; and the mucous stertor, from the presence of mucus or other fluids in the larger air-tubes. These three varieties, whatever their remote cause, are the immediate result of a local mechanical condition—a condition which may always and at once be changed, to the great relief of the patients, and sometimes to their permanent recovery. Since adopting this method of management, many other points have developed themselves of the utmost practical importance both to the surgeon and to the physician.

Case I.—In October, 1863, Mrs. S—— was seized with apoplexy. On my arrival, there was a partial return to consciousness, and the left side was found to be paralyzed. There was pharyngeal stertor when in the recumbent posture, and she appeared uneasy when placed on her right side, so she was placed on her left, when the stertor ceased. A blister was applied to the nape of the neck, and she remained in this posi-

tion for nine days. She was now better, and spoke to me. Fearing a bed-sore, I desired the nurse to change her position by turning her from her left to her right side. Soon after this was done she was distressed for breath, and the countenance became livid. On my arrival I found the difficulty of breathing gradually increasing, the blistered surface and the ear upon which she had lain of a dark purple hue, and the pulse, which had before been weak and irregular, full and bounding. There were large mucous râles over the whole chest; she was quite unconscious, and death from suffocation was imminent. Finding that these symptoms supervened upon the change of position, I had her replaced upon her left side, and immediately the pulse sank, the mucous stertor ceased, the breathing was relieved, the lividity of countenance passed away, and the blistered surface, which had been almost black, resumed a bright cherry-red color. This additional shock, however, proved too much for her, and she died the same day, calm and conscious.

The salient points of this interesting case are: (1) That pharyngeal stertor ceased when the patient was placed on her side; (2) that there was a slow but gradual improvement subsequent to this; (3) that mucous stertor and imminent death supervened when she was placed on the opposite side; (4) that relief was instant on resuming her original position; and (5) that a return to consciousness was coincident with the cessation of stertor—in other words, on the removal of the respiratory difficulty.

On a careful examination of the chest after she became quiet, I found all râles slowly fade away from the right side, that which was uppermost, and the natural breathing return; but the left lung, which had been dependent throughout, was dull on percussion and deficient in respiratory murmur. The explanation now became clear—viz., that the dependent lung had become filled with some mucous fluid, and that, on changing the side, the fluid, by gravitation, was finding its way across the trachea to the opposite lung, but in doing so it had been churned into foam by the in-going air, giving rise to mucous stertor, and that this foam, by filling up the larger bronchial tubes, was quickly causing suffocation, with all its usual results.

As a point of management, then, in a case of apoplexy, it would appear necessary to keep the patient on one side, and not to change it; but which should this be? Healthy people when lying on their side breathe chiefly with that which is uppermost; for the intercostal and other thoracic muscles of the lower one are fixed between the weight of the body and the bed, and the breathing of this side is almost entirely diaphragmatic.

Case II.—Dr. Fitzgerald, during his attendance on a case of cancer of the brain, finding the breathing much oppressed by mucus in the air passages, at my suggestion placed the patient on his side, when he became suddenly so much worse that immediate death appeared inevitable. Dr. Fitzgerald repeated the experiment with exactly the same results, and he found that the difficulty arose from mucus in the trachea and larger air tubes. It was afterward discovered that the paralyzed side was placed upward. Unfortunately, only the head was examined after death; but I have reason to believe that in hemiplegia from progressive disease of the brain a low form of inflammatory action takes place in the lung of the affected side, due to disturbed innervation of the pneumogastric nerves.

In a recent case of tubercular mass in the centre of the brain, which was under my care, this was the case, and precisely the same distress as above mentioned occurred from mucus when the paralyzed side was placed upward. It must be remembered, too, that in placing the paralyzed side downward the injured side of the brain is upward, and therefore relieved from congestion, a condition always liable to occur when an injured part remains dependent.

Apoplexy, with much mucous stertor, is, I believe, always of the most grave and dangerous character, for it indicates, as well as muscular paralysis, loss of function of such vital nerves as the pneumogastric; and I believe the time will soon come, now that cases can be so simplified by the removal of stertor, that by a careful consideration of the functions of the various nerves a very accurate diagnosis and prognosis will be arrived at even in the early stage of apoplexy.

Case III.—Mrs. W—— was found lying on her back, breathing stertorously and with great difficulty; the trachea

was filled with frothy mucus, and she was almost in a state of collapse. She was turned on her right side, when the stertor and difficulty of breathing ceased. Seventeen hours afterward she was lying quiet and comfortable; the depending cheek was dusky and congested, the upper cheek pale. She was now turned on her left side; the difficult breathing immediately returned, and both sides of the face became highly congested; the breathing was shallow, and large moist râles were present in both sides of the chest; on resuming the original position all difficulty ceased. She died the next morning.

The following case would, I believe, have terminated fatally but for the careful management of position:

Case VI.—Mrs. S—— was seized on September 24th, 1867, with left hemiplegia. She was unable to speak or to masticate, and could only swallow liquids with much difficulty; the pulse was 80, and very feeble. She was placed on her left side. On September 28th (four days after) the respiratory murmur on the left side was shallow and feeble, there were some râles, and the percussion sounds were dull. She was turned on her right side, when immediately great distress of breathing and mucous stertor supervened; this gradually disappeared on replacing her on her left side. When turned on her back, for the use of the bed-pan, mucous stertor commenced, and it was noticed that in this position the intercostal muscles and the diaphragm acted more feebly than on the unparalyzed side. On September 29th there was a little more power, and she was less excitable. The respirations, which had been 56, were now 44. She was able to remain half an hour on the right side before the difficult breathing commenced. The following day she was still better, and the dribbling of saliva, which had been very great, ceased, but she still had no control over her bladder or rectum. October 6th.—During the last week she has slowly improved. Several experiments of change of position have been made, and it was found that as her power returned she could remain longer on the right side before the difficulty of breathing commenced, and now can remain an hour and a half in this position. She speaks better, eats and sleeps better. Tongue is cleaning; bowels open, but she is still unable to retain her water. Pulse 80, respiration quiet and natural; on the right side the respi-

ratory murmur is natural, on the left there are still a few râles, but the resonance is good, and the air enters more freely. Power is returning to the hand and face. March, 1870.—The patient is still alive and well, but has a good deal of weakness on the left side.

Remarks.—In its early stage this case was most critical. Had a little extra strain been put upon the patient, she must have died, and no strain could have been worse than the persistence of a condition (stertorous breathing) which would indirectly cause obstruction in the jugulars. In the supine posture, from the paralyzed and insensible condition of the pharynx, much of the saliva which dribbled away in the lateral position would have entered the trachea and added to the trouble. Sir James Simpson, in writing of the treatment of phlegmasia dolens, says: "Position is one of the most powerful means in the treatment of many diseases; attention to this point is frequently of more importance and affords more satisfactory results than the use of any kind or quantity of drugs." In no case is this opinion of Sir James Simpson so aptly illustrated as in certain affections of the brain and air-passages. Dr. Bence Jones, in writing to me on this subject, says: "The case I mentioned to you was one of extreme hemiplegia of the right side, for the first few hours with perfect clearness of mind, passing in twelve hours into complete coma, with the most intense and distressing stertor, lasting for many hours. This was immediately stopped by changing the position of the patient to one side. But it had no known effect on the progress of the case. The total duration, I think, was not forty-eight hours. The gentleman was about sixty-two, pale and rather sickly, and had always feared apoplexy."

Mr. Reid, of Canterbury, and many other of my friends have reported to me cases of apoplexy in which, on the change of position, stertor has ceased, and the patients have died peacefully and quietly, to the great relief of the distressed and sorrowing relatives. I have never in my own practice failed to put an end to stertor by position and management.

Case V.—At a medical meeting in May, 1862, after urging my views on stertor, Mr. Francis, of Boughton, stated that he had just left an old lady dying from apoplexy, who had been in a state of stertor for many hours. At the November meet-

ing in the same year he informed us that the old lady was still alive and well. On his return home he found her just as he had left her—dying, as he believed. He changed her position, the stertor ceased, and she gradually but perfectly recovered.

Case VI.—Mr. Eustace Carver, of Melbourne, a former house surgeon at the Middlesex and Nottingham hospitals, and a careful observer, was called to Captain B——, in deep stertor and moribund. Life was evidently more a question of minutes than hours. The position was changed, the stertor ceased, and the old gentleman lived nine months.

Case VII.—Dr. Lewis, of Folkestone, was sent for to Mrs. F——, aged sixty-seven. He found her in bed in the apoplectic condition. There was total loss of consciousness, the pupils were fixed, but there was slight reflex action on touching the eyeball, the face was turgid, the cheeks were puffed out on expiration, and there was deep pharyngeal stertor. On being placed on her side, the stertor ceased and she gradually improved. In twelve hours she had perfectly recovered consciousness, the respiration was normal, the face very pale, the pulse quick and feeble; there was no paralysis. The action of the heart was feeble, but there was no murmur.

Case VIII.—I was called in August, 1859, to a boy who had fallen on his head from a height. I found him lying on his back, snoring, senseless, and collapsed; pulse irregular, and pupils alternately contracting and dilating. The mouth was half full of vomited matter. On turning him on his side the snoring (palatine stertor) ceased; he was sick several times, with comparative ease. Presently he began snoring while he was on his side—his chin was bent upon the sternum; on straightening the neck he was quiet. The boy slowly recovered.

On three different occasions in my own practice I have been summoned to cases of apoplexy with stertor, in which the patients recovered, two with and one without paralysis.

Case IV. demonstrates that as power returns to the brain the pneumogastric and probably also the sympathetic nerves regain their power, and effusion into the lung ceases; and, moreover, that the lung is not injured by remaining inactive and filled with mucus for a long period.

The consideration last mentioned induced me to adopt position in all conditions of the lungs in which much mucus was secreted. In April, 1866, a little child, three months old, after having suffered from a slight catarrh for a few days, was seized with difficulty of breathing at night. When I arrived in the morning the child was livid, the eyes sunken and half closed, and the pulse remarkably slow, feeble, and irregular. The child breathed with great difficulty, and had a loose mucous cough, feeble and ineffective. The quantity of mucus in the chest was so great that the child could not inspire, and appeared dying. It was turned on the right side, ammonia applied to the nostrils, and ten drops of brandy administered every quarter of an hour. On the following day it breathed with greater ease, the expression had improved, and the pulse, though still slow, had a little more power. The air now entered the left side freely, and the râles were few; no breathing at the right side. The child gradually recovered, but for several days there was bronchial breathing, and bronchial voice on the right side. Before the child was turned on the right side, there was no difference on auscultation between the two sides.

In bronchitis generally, and especially in the bronchitis of the old, I endeavored to leave one lung free for breathing, and then, as vital power returns, the position is gradually changed.

In the convulsions of children there is often a large flow of saliva and secretion in the bronchial tubes. This becomes immediately churned into foam, and greatly impedes respiration. In the lateral position all this drains away, the breathing is freed, and I have often seen recovery commence immediately.

In epilepsy the fit will often cease at once by removing stertor, but here it requires a little more management than placing the patient on his side, for the spasms of the mouth, tongue, and fauces require opposing by little mechanical contrivances.

In May, 1866, I was sent for to a phthisical patient who was said to be dying from hemorrhage. I found him lying upon his back, partially elevated by pillows, and apparently breathing his last. His face was cold and ghastly, his jaw dropped, and his eyes widely opened and staring. He made a few unsuccessful efforts to inspire, when some large mucous

râles were heard in the trachea. The pulse could just be felt feebly flickering. He was immediately placed well over on the right side, and ammonia was applied to the nostrils. A little brandy and water was introduced into the mouth, but there was no effort to swallow. A handkerchief was, however, soaked in brandy, and a portion left in the mouth. The mouth and tongue were quite cold. In a minute or two the respirations became longer, and air could be heard entering the uppermost lung, but none entered the lower. Gradually the râles diminished in the upper lung, air entered more freely, and the percussion sounds became more resonant. Consciousness, which had been utterly lost, gradually returned, and by the following morning he was perfectly himself, and could have transacted any business. He lived four days, breathing with one lung only.

On our arrival, my friend Dr. Lewis, who was with me, was so convinced that death must take place immediately, that he thought all our efforts to prolong life would be unavailing.

On the subject of drowning I do not propose to consider the various modes of resuscitation, but to comment merely upon the fluid contained in the lungs of drowned persons. The Committee of this Society (Royal Medical Chirurgical) on Drowning came to the conclusion "that it was the entrance of fluid into the lungs, and the effects thereby produced, which were the cause of death in drowning." Professor Caspar, as a result of his prolonged researches on drowned persons, asserts that as a rule water exists in the lungs in the form of fine vesicular foam, even in those who have never come to the surface after once being submerged.

In 1861 a woman who had been taken out of the Serpentine and treated by the hot bath at the receiving-house was brought to St. George's Hospital about one hour afterward. Mr. Jones, the resident medical officer, states that on admission "her breathing was fair, with loud rattling noise; her lips were livid, her pulse very good, her surface and extremities very cold; she was sensible and able to speak." Warmth and appropriate measures were employed, but in half an hour Mr. Jones was suddenly summoned, and only arrived to see her draw her last breath. The Marshall-Hall method was immediately employed for half an hour, without the slightest

signs of recovery, but a large quantity of frothy fluid came from the mouth. At the post-mortem examination, next day, it was reported that "both lungs contained an immense quantity of frothy fluid; the bronchi were filled with fluid and injected." In this case the lungs were loaded with and paralyzed by water. There cannot be a doubt that the Marshall Hall method used earlier would have unloaded the lungs; but I cannot doubt also that, had she been placed on one side on her arrival at the hospital, the upper lung would have cleared and acted quite sufficiently to sustain life. A lung containing frothy fluid does not clear immediately; the bells of foam must gradually coalesce and ooze slowly away: and to assist this nothing is more adapted than the Marshall-Hall method.

Dr. Trollope, of St. Leonards-on-Sea, was called to a man who had been taken out of the sea. The man could speak a little, and vomited a quantity of water; but he rapidly became worse, insensibility came on, the breathing was slow and faint, and the pulse flickering.

The Sylvester method was being used, and Dr. Trollope persisted in it for some few minutes. "Meanwhile," Dr. Trollope reports, "his respiration had ceased, beyond a slight mucous rattle in the windpipe; his heart's action could not be felt; jaw clenched, and lips livid. . . . I then, finding these alarming symptoms supervening in spite of the persistence in Dr. Sylvester's method, immediately had recourse to Dr. Marshall Hall's prone and postural, or 'ready,' method, and was gratified to find fluid escape from the mouth each time the body was laid on the chest, and respiration gradually set up, commencing with long-drawn respirations, or rather gaspings, at intervals. I persevered in the prone and postural movements for three-quarters of an hour, till respiration was thoroughly and satisfactorily established. The man then again vomited between a pint and a quart of water, and was afterward able to swallow a few tablespoonfuls of tea, and went on satisfactorily."

In March, 1862, I was called to a man who had been knocked into the sea by a heavy chain. It was calulated that he had been under water three minutes. On getting him ashore he was believed to be dead, but one of the men thought "they ought to get the water out of him," and so

proceeded to roll him from side to side, and while this was done, a quantity of water was expelled from the mouth, and they perceived some attempt at breathing.

A few minutes after this I was on the spot, and found the man apparently dying, making occasional and feeble attempts to breathe, with a very feeble and irregular pulse. He was lying on his side with his head upon a coat, and a quantity of froth tinged with blood lying on the coat in the neighborhood of his mouth. I observed that clear water and froth welled out of his mouth at the end of every inspiration. Active friction of the limbs, hot bottles and bricks, and ammonia to the nostrils, were carefully applied. Nearly an hour elapsed before we thought it possible he could live. He then began to moan, and in a short time a small quantity of brandy was swallowed. He entirely recovered.

In July, 1864, a man was capsized in a boat at sea. After being in the water some time, he was picked up and rowed ashore. On arrival he was cold and livid, but breathing with great labor. He was immediately turned on his side by the coast guardsmen, and a quantity of frothy fluid came from the mouth. He was taken to an inn, where he was kept on his side, and where I saw him a quarter of an hour afterward. He was then breathing with difficulty. A fine white froth, almost like milk, was oozing from his mouth and nose; his face was very livid, and meaningless in expression; his breath was cold; the limbs and body generally were almost stone cold; the pulse could not be felt. There were a few moist râles in the left side of the chest, the side which was uppermost, but the breathing was tolerably free; the breathing on the side upon which he lay was very feeble and obscure, and moist râles more abundant. He could not be roused. In half an hour he became a little restless, and then vomited a quantity of water. The pulse could now be felt, but not counted; this gradually improved. Attempts at vomiting supervened, and occasionally a partial restoration to consciousness. After another attack of vomiting, the pupils, which had been widely dilated, became contracted, and he went off into a sound sleep. He passed a most trying night from restlessness, and pain at the epigastrium; and the next day he was still livid, but better and easier. The following day pleuro-pneumonia of the right side (that

which was downward) supervened. From this he slowly recovered.

There are many interesting details connected with these cases of drowning which for brevity's sake I omit; but the cases, I hope, illustrate sufficiently that in drowning there is some fluid in the chest, and that all methods of resuscitation which do not provide for the removal of this fluid are utterly valueless. For my own part, my increasing experience only tends to prove that there is as yet no known method equal to that of the Marshall-Hall method.

Independently of its effect upon stertor, "position" has a direct influence in many conditions allied to the apoplectic, such as chloroform-poisoning, drunkenness, etc.; and I have observed that in cases of great exhaustion the change from the back to the side is accompanied by immediate and great relief; the breathing, from having been carried on with evident effort, has become at once peaceful and easy.

During sleep, when the vital powers are resting, it is not the back, but the side which is selected as Nature's position; and I believe the explanation to be that on the back the diaphragm has to lift the liver and abdominal organs with each respiration, whereas on the side—especially the right side—the liver lies practically on the bed, and the diaphragm can do its work without oppression.

The general conclusions which may, I think, be fairly deduced from the present communication are—

1. That a "laryngeal stertor" may be added to the three forms I formerly defined.

2. That the three forms of stertor which have a most important connection with the apoplectic state are the palatine, pharyngeal, and mucous stertor.

3. That these three varieties, whatever their remote cause, are the immediate result of a local mechanical condition—a condition which may always, and at once, be changed to the great relief of the patients, and sometimes to their permanent recovery.

4. That it is necessary to keep the patient on one side, that that side should not be changed, and that the paralyzed side should be downward.

5. That mucus and other fluids gravitate into and fill up

the lower lung; and therefore that if the sides be reversed the mucus will find its way into the opposite lung.

6. That the fluid, crossing from the large bronchi of one lung to those of the opposite, becomes churned into foam and causes dangerous obstruction to the respiration.

7. That the lung, by remaining inactive and filled with mucus for a long period, is not injured.

8. That these principles apply to all conditions in which mucus or fluid exists in the lungs, and also to all conditions allied to the apoplectic, whether there be mucus or not.

CHAPTER IV.

SUBSEQUENT EXPERIENCES OF STERTOROUS BREATHING IN THE APOPLECTIC CONDITION — VARIETIES OF STERTOR.

Illustration of Nasal Stertor.

A LADY, sixty years of age, fell head foremost down-stairs, and was taken up unconscious. She had complained much of head-discomfort in the morning, but nevertheless had been out for a short walk. The weather was thundery. On my arrival immediately after the fall, there was considerable ecchymosis at the outer angle of the left orbit; but there was no bleeding from the ears, nose, or mouth; nor was there any extravasation beneath the ocular conjunctivæ. I found her wholly unconscious, breathing stertorously, and vomiting. The right pupil was dilated and fixed; the left very sluggish. When she turned on her side the stertor ceased; the aspect of the face became almost natural; and she moved her left arm and leg, and remained like a person quietly sleeping for twenty-four hours. At this time, nasal stertor commenced, and gradually increased in intensity; and, *pari passu* the face became congested and turgid, the veins of the temple stood out in bold relief, and in about an hour she died.

Dr. Monckton saw this case with me in consultation; and I was able to demonstrate to him how stertor and its consequences instantly recommenced in this poor lady's case when she was placed in the supine position, and also how easily nasal stertor could be removed, either by pressing the tip of the nose upward or by dilating the nares with the handle of a salt-spoon.

Buccal Stertor.

There is yet one other form—the puffing out and flapping of the cheeks and lips which may be fairly dignified with the title of buccal stertor. Now, although this last does not give rise to any respiratory difficulty, it is, nevertheless, like nasal

stertor, of importance in prognosis, and useful for purposes of definition. Like nasal stertor, too, it is dependent on paralysis of the portio dura, and therefore indicates the approach of the intra-cranial mischief toward that part of the brain which governs the functions of organic life, or (which is a very important alternative) that both it and nasal stertor may arise simply from venous engorgement at the base of the brain, in consequence of the suffocative stertor damming the jugulars.

Authors have always looked upon this symptom as an extremely dangerous one; and so, no doubt, it is, in the combined conditions of apoplexy and suffocation; but, as I have observed both it and nasal stertor, in a modified degree, in the snoring sleeper, and as cases of suffocative apoplexy, in which it has been most marked, sometimes made a rapid recovery, I withhold my opinion for the present.

Indeed, it is almost impossible, from the writings of the past, to arrive at any conclusion as to the value of any symptom of apoplexy. We must now observe from a new point of view (apoplexy without suffocation), and draw our conclusions in the future. The following short case, already related to clear up another point, is a happy illustration of some of these remarks.

A lady, sixty-seven years of age, was found in her bed in an apoplectic condition. There was total loss of conciousness; the pupils were of about the usual size, but fixed; there was slight reflex action on touching the eyeball, and an occasional involuntary movement of the arms. The face was turgid, and there was both pharnygeal and buccal stertor. On being placed on her side the stertor instantly ceased, and she gradually improved. In twelve hours, she had perfectly recovered consciousness; the respiration was normal; the face very pale, and the pulse quick and feeble; and there was no paralysis.

Surely no case could have looked more unpromising than this, when the age is taken into consideration.

Stertor in the Lateral Position from Œdema.

I was asked by Dr. F. Eastes to see a case of interest at the Folkestone Infirmary. On entering the ward we found the patient fast asleep and snoring in an unusual manner. Dr.

E——, who was with us, thought it tracheal breathing, but, on observing more closely, it proved to be pharyngeal stertor, and the patient was lying on his side. In a few moments the breathing was natural; it then changed to palatine, a few moments later to pharyngeal stertor, the patient all the time remaining on his side. This was contrary to my usual experience, and needed explanation. When the patient awoke, I found him suffering from extreme œdema of the head and neck, with dilatation of the superficial veins of the chest, and a varicose condition of its venous capillaries, as well as of those down the outside of the arms. The soft palate hung low, and, with the whole of the pharynx, was œdematous, and consequently the breathing-space was remarkably contracted. It was now clear that even when the patient was on his side, and the chin only slightly bent toward the sternum, the dense and thickened cervical tissues would drive the larynx and root of the tongue up against the palate and back of the pharynx, thus still more contracting thebreathing-orifices, and giving rise to the condition causing stertor.

This explanation of the case just described would entirely accord with the theoretical explanation suggested by my original dissections of the parts made prior to the year 1860.

Nasal and Palatine Stertor—Apoplexy (Death).

Mrs. T. H——, aged seventy-four, was seized with apoplexy at 9:30, while at supper, and died five hours afterward. From the first she was pale and unconscious, and had tonic spasm of the right side; the jaws were closed, and there was some palatine and nasal stertor, even when she lay on her side. Both these were instantly stopped by pushing up the tip of the nose, which opened the nostrils widely, and the air rushed in freely and without impediment. If the stertor was allowed to continue, the face became congested, which congestion passed away with the freer respiration. With the removal of stertor supervened constant vomiting, which each time made the facial vessels turgid. How palpably must these two states, vomiting and stertor, tend to cause an increased outpouring from the lacerated vessels of the brain. An apoplexy is really an accident, the result of which is very much influenced by circumstances.

Apoplexy (Difficulty of Localization).

Mrs. N——, aged fifty-three, was seized with sudden pain in the head, vomiting, and faintness, at about 9:30 A.M., April 7th, 1871. She walked up four pairs of stairs to her bed-room, and on the arrival of Dr. Lewis at 10 A.M. was drowsy, but capable of being roused, and was perfectly intelligent, with a clear memory. She said if she went up-stairs she would never come down again. The condition looked more that of drunkenness than apoplexy. Pulse 80. Pupils rather contracted, conjunctivæ sensitive, no paralysis, a loose bilious action of the bowels.

April 9th, 11 A.M.—I found her lying on her side, breathing easily and gently, the skin slightly moist and warm, temperature 100.4°, pulse 96, soft. She was wholly unconscious. The pupils were moderately contracted and fixed, the conjunctivæ had lost their sensitiveness; the jaw was clenched, and when I tried to open it she put up her hands, apparently to stop me. She had passed water freely in the bed, but there had been no action of the bowels, notwithstanding that croton oil had been taken, and a turpentine enema administered. Blisters had been applied. I turned her on her back, and slight palatine stertor ensued, which gradually deepened, but, as the face was becoming darker, I turned her back to her side, when the stertor ceased. It was evident that she could move all her limbs, although she did so but feebly.

In the evening she was worse, and at 3 A.M. of April 10th she died. Those who watched her said that for many hours before her death the breathing was very bad, and rendered difficult by nasal stertor; there were a few râles, but no marked mucous stertor. There had been no previous head symptoms.

Post-mortem Examination.—The face had a livid appearance. Only the head was examined. The scalp and dura mater were somewhat unusually adherant, and the skull rather thick. On removing the dura mater a large extravasation was seen to have taken place, extending over almost the whole surface of the right hemisphere beneath the visceral arachnoid, and extending downward beneath its base, and thence to the base of the left hemisphere and along the pons Varolii and medulla oblongata into the spinal canal, dipping between the convolutions in its course.

Above the middle third of the right hemisphere, in its substance, to the outer side, but not connected with the lateral ventricle, was a large firm clot, weighing about two ounces. The upper part of the clot communicated through a ruptured convolution with the effusion on the brain-surface; it was evident that the bleeding had commenced in the substance, and then burst its way out, but the exact origin could not be detected. The course of the hemorrhage on the surface was just that which would result from gravitation, for the patient had been kept on her left side. The clot cavity was lined by softened, creamy, blood-stained brain-substance, more than the eighth of an inch thick. The lateral ventricles were filled with clear serum, and the right was distorted by the blood-pressure. The corpus striatum of the right side was compressed and blood-stained, but there was no laceration of its substance.

Remarks.—It was impossible to diagnose the side of the effusion, for there was no definite paralysis; probably had she lain on her back, the increase of stertorous breathing would sooner have interfered with muscular action, and either betrayed the side affected or have earlier caused death. Was the nasal stertor caused by the advent of effused blood to the medulla? Its continuance certainly hastened death.

Buccal, Palatine, Pharyngeal, and Laryngeal Stertor in the Same Case all relieved by Management. Pulse of Suffocation.

On May 8th, 1882, I was requested by Mr. Charles Lewis to meet him in consultation on a case of apoplexy at 11 A.M. The patient, a man aged sixty, felt ill while buttering his toast at 8:30, got up, leaned against the door, and said his head was bad, and requested a doctor to be sent for. He was guided to a sofa, and on Mr. Lewis's arrival, a few minutes after, he was in deep stertor, with pale face, livid nose, and hard bounding pulse. Mr. Lewis found it difficult to do away with the stertor, and could only do so by straightening the neck, *i.e.*, removing the chin further away from the sternum.

I found the patient lying on his side, with deep pharyngeal stertor and a strong bounding pulse, rather pale, expressionless face, and bluish cold nose. Mr. Lewis found that his head had shifted again toward his sternum. On straightening

the neck, it was found that laryngeal stertor (crowing inspiration) to some extent existed, apparently due to sticky mucus in the larynx; but even after some attempts at vomiting, by which a large mass of mucus was expelled, it continued, but not sufficiently severe to be much of an impediment to the breathing. By altering the position of the head, we could at will produce buccal, palatine, and pharyngeal stertor. The pupils were somewhat contracted and fixed, and the conjunctivæ completely insensible. There had been at first convulsive spasms of the limbs, and even now, after the stertor had ceased, slight occasional tremors were observed in the arms.

From the completeness of the coma it was clear that both sides of the brain, or that the parts about the medulla, were injured; that the latter was most probable might be inferred from the complete paresis of the fifth, seventh, and ninth nerves, and probably the eighth also. An unfavorable prognosis was given. He died without change of symptoms at 3 P.M.

When Mr. Lewis first saw the patient at 8:30 A.M., *i.e.*, before the full development of stertor, he had a small, slow, weak pulse (the pulse of shock or collapse); as the stertor continued, in about an hour it was full, and then became hard and bounding; then, as stated above, after the stertor had been silenced, *i.e.*, after the breathing had become easy, the pulse again became soft and weak.

Mr. Lewis observed that, in order to remove all impediment to the breathing, in addition to straightening the neck, it was necessary to have the elbow of the arm on which he was lying projecting behind his back; this was necessary in consequence of the large mass of flesh and fat of the shoulder being pressed up into the neck, or rather from the weighty head and neck pressing down on to the shoulder mass.

Snoring Stertor.

Naso-palatine snoring, occurring when the air-current passes through the nose and causes the palate to vibrate, and oro-palatine, when the current passes through the mouth, are both caused by the larynx and base of the tongue moving slightly upward and backward during the inspiration, and the latter approaching the velum and narrowing the passage.

This is much facilitated by the bending forward of the head, so contracting the space in the pharyngeal cavity; and, conversely, it is rendered more difficult, almost impossible, by the head being thrown back. Sometimes, especially in old people, the snoring becomes a genuine pharyngeal stertor. The tendency of the larynx and tongue to ascend during inspiration may often be observed in the dying state, especially when the mouth is widely open.

The snoring of children with enlarged tonsils is oro-tonsillar and oro-pharyngeal: the mouth in these cases is open, and the tongue in the morning dry and brownish from the continued removal of its moisture by evaporation.

Mucous Stertor and its Dangers.

This has already been referred to in Cases I. and IV. in Chapter II., pp. 717 and 720, in which the dangers that may arise from mucus in the air-passages are very fully set forth; but the subject is so important that I may add another case or two in further illustration.

On January 15th a gentleman, while signing his name to a document, became faint and vomited; he was conveyed home. On my arrival soon after, I found him conscious, but very faint and sick, and slightly paralyzed on his left side.

On the 16th he was much better in every way, but his pulse was only 38.

On the 17th, while taking his breakfast, he became suddenly aphasic, and was paralyzed on the right side, but his consciousness was unaffected.

On the 18th, at 4 A.M., he became completely unconscious, his pulse (40 to 60) and respiration were irregular, and his power of deglutition was lost. At 10 A.M., I found him lying on his back, breathing stertorously, his face bloated and of a deep purple-red color. He was turned on his side, when the stertor ceased, the face cleared and became natural, and the pulse quiet and less thumping.

On the 19th, while lying in a quiet, unconscious state, he was turned on his back, when stertor recommenced, and he was nearly suffocated, until his position was changed to his side. His pulse and respiration now increased in frequency, and on the evening of the 20th he died quietly, and without suffering.

I watched the condition of the chest, and found the side which had been lowermost dull on percussion, and that very little air entered the lung of that side; mucus, and perhaps œdema, had contracted the air-space. On changing his position, râles appeared on the sound side, accompanied by the urgent danger above related.

Dr. Elin, of Hertford, in writing to me in 1881, says: "I was much interested in your pamphlet; it brought to my mind a case that I was attending some ten years ago—a patient about sixty, with a sharp attack of bronchitis; chest full of râles, worse on the left than on the right side. He breathed easiest while lying on the left side. I left directions to keep him on that side, and on no account to turn him on the right; but they let him do it, suffocation set in, and he was dead before I got to him."

Croupy Stertor from Mucus in the Glottis, simulating Spasm of the Glottis.

A child about six weeks old, in the last stage of exhaustion from malnutrition, was seized with spasm of the facial muscles of the nature of trismus; there was also divergent squint.

These symptoms subsided in about twenty-four hours, but were followed by what the nurse, a trained and intelligent woman, called spasmodic croup; she declared the child had died many deaths during the night. Fortunately, I had the opportunity of being present at one of these attacks, and I observed that the spasm was followed by large loose râles in the throat. The child was turned on its side, when a quantity of clear saliva drained away from its mouth, the attacks ceased from that moment, and the râles were no more heard. It was evident, from the child's weakness, that it was unable to expel the saliva from the glottis, and was much in the condition of a child who had got its food the wrong way. It should be added that the child was the subject of cleft palate, and this may have contributed to its difficulties.

Apoplexy. Stertor. Euthanasia.

A stout, healthy-looking lady of fifty-four years of age, and liable to intermittent attacks of neuralgia in the head and face, complained of headache, and took an aperient pill for its relief. The next morning (November 24th, 1887), at daybreak,

she was found sitting at the wash-stand, feeling faint and sick and making occasional attempts to vomit. She appeared dazed, and her sensibilities were all dulled. Her maid induced her to get to bed, which she was able to do with assistance. At eleven o'clock, as she did not improve, Mr. C. Lewis was sent for, and he found her in the condition above named, but worse. He elicited that the aperient had acted freely, but, perceiving that the brain was oppressed, he administered four grains of calomel. At three P.M., he found her completely comatose. On placing her on her back, after a time, stertor commenced, and gradually increased in intensity; she was then placed on her side, and a blister was applied to the nape of the neck. The pupils at this time were moderately contracted and fixed, but conjunctival sensibility was not lost. She was perfectly indifferent to any attempts to rouse her, but it was evident that there was no special paralysis at that time of any limb, nor was the face distorted. The pulse was soft and feeble, and the contenance calm and free from flushing. In the evening I saw her in consultation, and found her in the condition just mentioned. The urine was passed involuntarily; there was no fever, and no indication for any special treatment. It was quite impossible to administer medicine by the mouth, as she was unable to swallow even a drop of water. The bowels had not acted, but, as they had been freely relieved in the early morning, this was considered unimportant. An "injectio rutæ" was administered, but it was not retained; mustard plasters were applied to the calves of the legs, and ice to the head. On the following day (November 25th), there was still no change, except that the pulse had risen in frequency and was a little fuller. Another injection was ordered, and leeches were applied to the temple. November 26th.—She appeared just as we had left her, in a deep sleep; no pain, apparently not even a discomfort. The injection produced no effect, the face was a little more flushed; the pulse had risen to 100, and the temperature ranged about 100°. November 27th.—She was more flushed, and during the day she quietly passed away. The temperature rose to 106° just before her death. The bladder had emptied itself involuntarily during the whole time; shortly before death two ounces of urine were obtained; it contained albumin, but no casts or blood.

Remarks.—Could anything more have been done in this case? When first seen, she was nearly in a state of syncope, and the bowels had been freely opened, so that blood-letting or drastic aperients were contra-indicated. At my visit in the evening, although the condition was clearly apoplectic, we made the most searching inquiries into possibilities of poisoning. The aspect was not that of opium-poisoning, nor were the pupils as contracted as they would have been if such a profound condition of coma had been produced by opium. Moreover, there was no opium or morphine to be found after a strict scrutiny of the rooms and drawers. We found a box of cocaine lozenges, from which some had been taken, but we had reason to believe that few, if any, had been taken the preceding night. We had, therefore, no doubt that hemorrhage had taken place in an important part of the brain, and that we could only wait and watch events; and, as I hold the promotion of euthanasia to be an important part of a physician's duty in cases which appear irremediable, we determined not to harm our patient by what the late Sir Thomas Watson would have called "senseless routine formalities." It is certain that the stertorous breathing and its distressful accompaniment, gradual suffocation, were avoided by the management of the position of the patient, and thus the family and friends were at least spared the harrowing appearances of that condition, as well as the persistent and painful sounds of stertorous respiration. The patient literally, from beginning to end, slept her life away. When one remembers the remarkable accounts of recoveries after severe and repeated blood-lettings reported by the celebrated Dr. Abercrombie in times past, and at the same time feels acutely the utter helplessness of one's position when face to face with a case like this, I confess it is, to my mind, an open question whether one ought not to yield our present prejudices against blood-letting to the convictions of its utility handed down to us by the great ones of the past, even if the general symptoms do not appear to justify its employment. It would be consistent with pathology to attempt to check an oozing from small vessels in one part by freer blood-letting elsewhere, which tends, among other things, to the more rapid formation of fibrinous coagulation in the vessels.

Apoplexy—Stertor in the Lateral Position; Apparent Contravention of Ordinary Law.

Colonel B——, æt. 55, the subject of albuminuria, and a man much addicted to sherry, found himself (on October 28th, 1889) unable to use his fork at dinner. He had not long returned from the club, where he had been playing billiards, and had appeared quite cheery and well. I saw him about an hour later in consultation with Mr. Charles Lewis; he was partially undressed and on his knees, constantly passing small quantities of limpid urine, partly into a vessel and partly on the floor, for he had already drifted into a half-stupid, helpless condition, with left hemiplegia. The right pupil was extremely small, but this was said to have existed for years; the left was contracted and sluggish; the tongue was pushed over to the left, and there was left facial paralysis. The pulse was excited, but soft and small. There was constant restlessness and irregular movement of the right side, and some moanings, but no complaint of specific suffering of any kind.

Five grains of calomel were placed on the tongue, a blister to the back of the neck, and mustard poultices to the calves of the legs. On the following morning he was quiet, quite unconscious, and breathing stertorously. On careful observation it was seen that the stertor was of the palatine and mucous varieties, and that there was but little real obstruction to the entrance of air.

In this respect a great change for the better had taken place since Mr. Lewis had altered the patient's position earlier in the morning. We now changed his position slightly, more toward pronation, and supported the back with pillows; the stertor then ceased altogether, and a quantity of very viscid mucus was expelled from the mouth. A second five grains of calomel had been administered in the night, and croton oil in glycerin early in the morning, but there had been no action of the bowels, and the urine was passed unconsciously. Swallowing was now impossible; it was even doubtful if any of the croton oil which had been administered had entered the stomach. From the nurse's account, it was more likely to have found its way into the windpipe.

An aperient enema was administered, and another blister applied. In the evening, at the request of Mr. Manley Sims

(who, as his own doctor, now came to see him), ice was applied to his head. He was now in a state of profound apoplectic coma, but there was no stertor, and his pulse was soft and small.

On the following morning (October 30th), he was exactly as we had placed him the preceding evening, but there was now some stertor. On investigation it was noted that it was expiratory stertor, and arose entirely from loose viscid mucus in the fauces; this was removed by the nurse, and the stertor ceased. He sank quietly about two hours afterward.

Remarks.—His wife told us that for some months previously he had suffered from sudden startings and movements during sleep, and cramps in his legs, and on suddenly awaking would burst into a profuse warm perspiration. He was gouty, and very careless in his mode of life. It will have been seen, from the report of the case, that stertor was present on two occasions, even when the patient was on his side, but that the physical causes were slight and immediately removable, and that the obstruction to the respiration was not sufficient to cause suffocative breathing of importance to the patient's life. Noise alone must not be trusted as a symptom, but its amount, nature, and cause must at all times be scrupulously investigated; treatment then becomes both simple and effective.

Opium-poisoning or Apoplexy? Euthanasia.

On Friday, February 17th, 1888, Mrs. W——, æt. 51, was seized with violent, agonizing headache. She took two moderate doses of chloral, but soon after rejected them. Later on she took twenty grains of bromide of potassium, and, finding herself no better, in the evening, at seven o'clock, she insisted upon having administered a hypodermic injection of morphia. Her doctor objected strongly to this, as he knew her to be suffering from albuminuria. She protested that she had repeatedly had it done before under similar circumstances, and that it had suited her well. She vomited within two minutes of the injection, and then quietly fell asleep.

The following morning, February 18th, the doctor was sent for in haste, as her husband was alarmed at her condition. She had been breathing stertorously all night, and was then very seriously exhausted, in a profound state of coma, with

stertorous respiration and a cold clammy skin. She was turned on her side, and the stertor ceased. There was no conjunctival reflex; the pupils were contracted and fixed, the breathing was quick and shallow, and the pulse extremely feeble. She was unable to swallow.

At 9 A.M. I was summoned in consultation, and found her in the condition just described, except that her face was now warm. Her pulse was now 108, and her respirations 48. It was quite impossible to rouse her, or to attract her attention in any way. The pulse was so feeble, and the condition generally so grave, that we had reason to fear her life would have ebbed away in the course of half an hour. All attempts at rousing only made the pulse flicker, and cause us to fear that immediate death was impending.

The question which presented itself for solution was, What was the direct cause of such grave symptoms? Was it opium-poisoning, was it uræmic poisoning, or was it ingravescent apoplexy? I was inclined to believe that it was apoplexy, but we felt it right to act as far as we dared as if it were the result of the hypodermic injection. Caffeine was twice injected into the arm, and a rue-injection administered per anum, and ammonia was kept constantly over the widely opened mouth. At 1 P.M. she was rather improved; her respirations were 38, and her pulse was slightly firmer, but there was still no conjunctival reflex. At 6 P.M. she was still a little better, and her respirations remained the same. A blister was applied to the nape of the neck, and, as she could now swallow a little, a teacupful of milk was ordered to be given every three hours.

On February 19th, 9 A.M., she looked more natural in expression; she smiled when spoken to, but evidently was without understanding. The left pupil was more dilated than the right, but both were fixed; the pulse was 100, and more resistant, and the respirations 48. At 7 P.M. she was less well. The temperature had risen to 99.5°, and her pulse to 120. Four grains of calomel were given, and the milk continued as before.

February 20th, 9 A.M.—She was in all respects worse. Both pupils were now dilated and unaffected by light. The bowels had been relieved by castor-oil injection. From this time until her death in the afternoon she slept quietly. There had

never been any stertor from the moment she was first turned on her side; nor had there been the slightest sign of suffering from the beginning to the end of the illness.

The Onset of Pneumonia Simulating Apoplexy.

Mr. L——, æt. 84, was taken suddenly ill on November 18th, 1887, at 8:30 A.M. Mr. Lewis saw him, and found him so far unconscious as to be unable to answer questions; he could be aroused sufficiently to put out his tongue, which, when protruded, was directed to the right side, and his face was drawn to the right side also; the pupils were small and regular, and acted to light; the right arm and right leg were apparently completely paralyzed; the pulse was intermittent, soft, and not more than 30 to the minute. He looked like a dying man. Half an ounce of brandy in milk was administered with difficulty, when the pulse immediately improved.

Soon after nine I saw him. He was expressionless and pale, and his mouth was partly open. In a minute his pulse fell to 27, when his jaw dropped, his eyes turned up, a ghastly expression came over his face, and a slight epileptiform convulsion supervened.

I thought him dying, but more brandy was administered, his pulse rose to 30, and he rallied.

After taking more brandy he became more conscious, and it was then seen that the tongue was put straight out, and that the facial paralysis had disappeared; moreover, it was now the left side of the body which was paralyzed, and he could now move his right arm and leg; his urine passed unconsciously. Brandy and milk were administered at short intervals, and during the day he gradually rallied. On the following morning (November 19th) his pulse was 56 and somewhat full, his temperature elevated, and his respiration seemed irregular and quickened.

November 20th.—Pneumonia of the right base was detected, and the general symptoms now pointed in this direction. From this time he slowly recovered.

Remarks.—It appears that Mr. L—— had taken an ordinary aperient pill the day before his attack, and had been much prostrated by its action.

The sudden onset of the symptoms and the accompanying

paralysis made it almost certain that the attack was apoplectic, but the further course of the malady appeared to indicate that the grave nerve-symptoms only substituted the rigor which usually inaugurates the onset of pneumonia, and that the extreme inhibitive action of the pneumogastric so lowered the heart's action as to cause almost fatal anæmia of the brain, giving rise to those epileptiform attacks which frequently accompany death from hemorrhage. In this, the case is similar to that of a gentleman of my acquaintance whose pulse was delayed, at times, to 17 in the minute, and invariably, when it arrived at that number, convulsions occurred. Dr. Tyson, who attended him, informs me that he could tell with absolute certainty when an attack of convulsions would occur, and he had, during the long illness from which this gentleman suffered, many opportunities of confirming this observation.

I introduce this case in the series of Apoplexy as an illustration of the difficulties of diagnosis in the early stage of a sudden attack. There is, however, one other point in connection with this convulsive attack to be entertained, and that is the irritative and depressing effect of an aperient. We have all of us seen, from time to time, especially in children, convulsions of a very violent kind supervene on the action of an aperient administered for a supposed bilious or febrile attack, and we have often had to wonder whether those convulsions were caused by the aperient or by the onset of one of the eruptive fevers, and we have as often doubted the treatment we ought to pursue.

Stertor in Fractures of the Skull.

"Cambridge, September 14th, 1889.

"My Dear Bowles.

"About a fortnight ago I was called in consultation to see a gentleman in the country who a few days before had been thrown out of his dog-cart on to his head: he had been seen by Professor Humphry a few days previously, and in his absence the local doctor sent for me. I found the patient lying on his back, and making such a noise during breathing that one might have heard him half-way down the stairs. I looked at my patient, and immediately realized the danger

he was in; his throat was full of mucus, which was oscillating between his velum and trachea or some higher point. He was quite insensible, and every now and then, in the midst of irregular and shallow breathing, associated with a tremendous rattle, he seemed as if he were going to choke instanter. Your aphorism, 'Turn him on his side,' immediately occurred to me, and, in less time than it takes me to write this, the noisy breathing had almost disappeared. I had him turned at first somewhat on his face, to let a quantity of mucus run out of his mouth, and then left him, with strict injunctions to his attendants that he should on no account be allowed to lie on his back. When I first saw him I was exceedingly alarmed, and thought that he had but a short time to live, for he had deep stertor, a bluish face, and swollen, turgid veins. Had I not been sent for, I believe the patient would have been dead before many hours had elapsed; instead of this, on visiting him the next day, his wife said that he had been sleeping 'beautifully and quietly.' He gradually regained consciousness, and is now convalescent.

"Ever yours sincerely,

"E. Carver."

A case of death from fracture of the skull attended with stertor has already been related (*vide* p. 729), and, as well, an account of the post-mortem examination. Reasons are also given how lives may be saved in these cases by the effectual relief of the patient from stertorous respiration. The above case related by Mr. Carver effectively illustrates the truth of the views then expressed.

CHAPTER V.

ON CERTAIN DANGERS AND RESPIRATORY DIFFICULTIES ARISING DURING THE ADMINISTRATION OF ANÆSTHETICS, AND IN OTHER CONDITIONS.

It will readily be conceded that a person under the full influence of an anæsthetic is in a condition physically equivalent to a person in the apoplectic state, and subject, therefore, to the same physical laws. The tongue will gravitate to the lowest point; the vomit may enter the larynx; the mucus, which under some circumstances is largely secreted, froths up and collects about the aditus laryngis; and the chin, if bent on the sternum, contracts the pharyngeal cavity and narrows the airway; so that respiratory impediments of various kinds are ever at hand to add to the anxieties of the administrator.

These difficulties were well known to me in 1856, when I made my first dissections for the purpose of investigating their causes; and I indicated their applications to chloroform dangers in a paper read at that time at the St. George's Hospital Medical Society, and subsequently published in the Transactions of that year. In the debate, Mr. Harvey stated that Professor Syme was in the habit of seizing the tongue with a pair of forceps and drawing it away from the back of the pharynx when respiratory embarrassment occurred from this cause. I had reason to doubt the efficacy of Professor Syme's proceeding; and subsequently, I was enabled to prove its untrustworthiness from experiments performed on myself, and from subsequent dissections. Pulling at the tongue's tip will not always raise its base, nor the epiglottis; neither will it clear away mucus or vomited matter.

For some years past [10] Dr. Frederick Hewett has made a careful study of the causes of the dangers connected with the administration of anæsthetics. He has shown that even very slight impediments to the respiratory function give rise to immediate and grave danger, and that the beginning of ster-

tor ought to be the beginning of anxiety to the administrator, as the heart is then liable to almost instant failure. He says, in his conclusion, that "the slightest impediment to respiration should be corrected as soon as possible, in order to prevent an apnœa of a more abiding character from becoming established."

As to the causes of the impediment, he is entirely in accord with the views I have so frequently enforced, and he further draws attention to the fact that "the tongue and parts constituting the boundaries of the upper air-passages may, by vascular engorgement, become swollen, and thus obstruct respiration. The more plethoric, bloated, and flabby the patient, the greater will be the tendency to the latter form of embarrassment."

In the large number of reports of accidents from anæsthetics published in the journals, illustrations of the causes above referred to may be detected; and although there may be a feeling in the minds of the administrators that impeded respiration may be a source of mischief, the exact cause is not usually made out with sufficient certainty to enforce complete removal of the, perhaps, one and only impediment. In the haste and anxiety to do something, many measures are only half executed, thoroughness is overlooked, and some little thing is left undone, which might make all the difference to the life of the patient.

Of the following illustrative cases the first occurred in my own experience:

Case I.—In the year 1863 I was present at the reduction of a dislocation of the shoulder in a county infirmary. The patient was sitting on a chair fastened to a post, while the pulleys were on the arm. After chloroform had been administered for some time, the man suddenly ceased breathing and became deadly pale, jaw dropped, and the tongue touched the incisor teeth. The gentleman who had charge of the chloroform immediately procured water and dashed it on the face and back. Seeing the man did not recover, I at once, though a stranger, introduced my finger into his mouth and hooked up the base of the tongue, when the patient instantly inspired, and rallied without further difficulty.

Case II.—In March, 1891, Dr. Percy Lewis was administer-

ing chloroform to a very fat woman of sixty years, for the removal of a urethral caruncle. At the operator's request, the patient was anæthetized on her back. She became unconscious in about three minutes, when she suddenly ceased breathing, and became of an ashy gray color. Pulling on the tongue had no effect; but when, with the help of the operator, she was turned on her side, the tongue and parts at the base of it falling forward, as they must do in that position, she gave a gasp, respiration recommenced, and her normal color returned.

Dr. P. Lewis has several times seen this accident occur in hospital practice, when patients have been chloroformed on their backs, and has, as often, seen the patients revive when effectively turned on their side.

Case III.—In the "Lancet" of 1874 a case is recorded as follows: "Geo. W, aged forty-eight, a strong, healthy-looking man, occupation a joiner, described as a drunkard and a passionate man, was admitted into the General Infirmary at Leeds on July 15th, 1874, suffering from destructive inflammation of the middle joint of the long finger of the right hand, which was caused by his striking a comrade in a quarrel. On Thursday, July 16th, he was brought into the operating-theatre for the purpose of having the finger amputated, and at his own request chloroform was administered by the house-physician in the usual way, on a square piece of lint, and from a bottle with a drop-cork. He took it rather badly, struggled more than is usual, and was just fully under the influence of the chloroform, not having taken more than two drachms, and the operation barely begun, when he gave two or three snorts, suddenly becoming livid in the face, his respiration stopped, and his pulse became very faint at the wrist. Artificial respiration by the Sylvester method was at once commenced and continued for an hour, together with cold affusion to face and chest, galvanism to heart and diaphragm, and ammonia to the nostrils. The heart was heard to beat faintly at the end of about twenty minutes; after that no sound could be detected, and no voluntary attempt at respiration was at any time made by the patient. The autopsy was made twenty-two hours after death. The brain was found healthy, the lungs were slightly congested. The heart was flabby,

slightly enlarged, weighing twelve and one-half ounces. Both ventricles contained a little fluid; blood-valves healthy. The abdominal organs generally were congested, but otherwise healthy. The stomach was perfectly empty.

In answer to my inquiries for further particulars relating to the above, the house-physician, Dr. Pickles, wrote: "1. There was no stertorous breathing. 2. We kept the tongue forward by means of artery-forceps during the whole time artificial respiration was being performed. 3. We did not listen for any respiratory murmur, but we could hear the air enter and leave the chest very distinctly."

Case IV.—In the "British Medical Journal" of October 19th, 1889, "A death from the inhalation of chloroform occurred at the Richmond (Ireland) Hospital. The patient was a woman about to undergo amputation of the thumb. She had taken a very few inspirations, when her face was observed to become deeply congested. The administration of the anæsthetic was at once stopped, artificial respiration was set up, and the external jugular vein opened, but she never rallied. At the post-mortem examination the heart was found to be infiltrated with fat, and the brain congested."

Case V.—In the "British Medical Journal" of November 8th, 1890, a case of death under chloroform is recorded at St. Mary's Hospital as follows: "J. T——, a laborer, aged thirty-six, a well-nourished man with a florid complexion, was admitted on October 11th, having a recent fracture of his left patella. It was decided to wash out the distended knee-joint, and to approximate the fragments with pins (Mayo Robson's method).

"On October 15th the patient was taken to the theatre for this purpose. Auscultation of the heart showed no murmurs and good heart-sounds, though the first was somewhat too clear. The patient appeared very nervous. Chloroform was given by me in a flannel inhaler, with plenty of air. During the early minutes he struggled a good deal, called out, and two or three times he held his breath momentarily. The pulse was at this time frequent and irregular in force, but the patient's color was good, and there was no suspicion of danger. Suddenly, and just after a very short *spasm of glottis and masseters* (the italics are mine) his temporal pulse ceased. Artificial respiraton was immediately begun, injec-

tions of ether and strychnine were given, and faradism tried; and a superficial vein in the neck was opened. During the first half-minute of the artificial respiration there were three inspiratory gasps, but no other evidence of reaction. The heart ceased to act at about four or five minutes from the time of commencing the anæsthetic, and half a minute before death the conjunctival reflex was present. The pupils remained somewhat contracted during the whole period, and after death.

"The post-mortem examination showed that the lungs were engorged, and that there was much fat under the epicardium. The *right* (italics are mine) *heart was distended with liquid blood, and the left heart empty.* The substance was pale and friable, and the muscle-fibres showed under the microscope advanced fatty degeneration. There was some early atheroma of the root of the aorta. The liver was very soft, but not markedly fatty. The kidneys were of normal size, the capsules adherent in part. There was some increase of intertubular tissue, and numerous fat globules were seen in the tubal epithelium."

Note by Mr. Page.—"I had not at the time, nor have I now, the least doubt that the death in this case was due to sudden heart-failure. Waiting to begin the operation, my eyes were upon him at the moment the first sign of danger was seen, and instantly, without the shortest delay, I myself began artificial respiration. The three deep inspiratory gasps which followed were like the inspirations of the dying, and bore no likeness to the breathing which comes in response to artificial respiration. I felt sure, and then remarked, that the man was dead, and there never was the trace even of a response to the various efforts at restoration which were kept up for half an hour. That danger under anæsthetics is much more frequent on the respiratory than on the cardiac side I feel little or no doubt, from my own experience and observation. I have long made it a practice at once to begin artificial respiration, and I am confident that in several instances —some of them most alarming—life has been saved in this way. I am convinced, however, that, as in this case, death may in rare instances be the result of heart-failure."

The above case, so carefully reported by Mr. H. Collyer,

the resident obstetric officer, and afterward commented on by Mr. Page, no doubt was, as Mr. Page insists, due to cardiac failure. But there are a few points in the relation of the case which may raise some question in the mind of the reader. In the first place, there was "spasm of the glottis," and therefore obstruction primarily to respiration; secondly, the method of the artificial respiration is not described; thirdly, "a vein in the neck was opened" to relieve engorgement, one presumes, of the right side of the heart.

At the post-mortem examination, "the right side was distended with liquid blood, and the left heart empty," the admitted pathological condition of obstructed respiration.

Personally, I am always so suspicious, in all these cases, of possible existing mechanical obstruction, that I should be disposed to believe, even in this carefully-managed case, if the patient were treated on his back, that a block in the pharynx might still have been overlooked.

Case VI.—When in Berlin in November, 1890, seeking information on Professor Koch's system of inoculation, I had the opportunity of being present at some operations performed under the supervision of Professor Von Bergmann. In one case, during the administration of chloroform, I observed the patient suddenly cease to breathe, and the administrator's face to flush up and become anxious. He at once stopped the chloroform, and tried to rouse the patient, but with no good result, until he turned the patient's head sideways, placed his fingers behind the ramus of the jaw, and pressed it forcibly forward and upward. The respiration instantly recommenced, and the operation was completed without further incident.

I do not, of course, pretend to say that in all cases death arises only from the falling back of the tongue; but it must be admitted that the cases, as reported, are often open to such an interpretation. As the Sylvester method of artificial respiration is the one now in common use, it is fair to infer, unless otherwise stated, that such was the method employed when no special one is mentioned; and as this is employed when the patient is lying on his back, we may assume, with much certainty, the constant presence of a possible and probable cause of mischievous obstruction in the helpless and depending tongue.

Suffocation from poison or poisonous gases does not produce the same series of phenomena as suffocation from mechanical causes, or rather not in the same sequence. In the former cases, the blood and the heart are primarily acted upon; the circulation is first interfered with, and then the respiration.

In syncope, too, the respiratory disturbances are secondary to the cardiac failure; but in these cases, as in every other form of unconsciousness, the airways must be jealously watched, and every possible obstacle to the free and easy entrance of air must be removed. In all these states, the tongue and its attached muscles become in effect paralyzed, and, therefore, subject to the ordinary laws of gravitation.

In drowning or submersion the conditions are even more complex. It is true that danger arises primarily from deprivation of air—apnœa; but the entrance of water into the lungs produces rapid and serious changes in the blood and circulation, and shock, syncope, and spasm, more or less combined, become additional causes of danger, requiring the fullest consideration in our management of the case. It is not proposed now to discuss this subject in all its bearings; but sufficient has already been said in these pages to show that, with regard to the position of the body and to the removal of the mechanical obstruction, the same rule holds as in every state of general paralysis or unconsciousness; but in drowning it is, in addition, necessary to evacuate the water from the lungs, and to provide for the introduction of fresh air by artificial respiration. The proper system or method of the artificial respiration has for years been much under discussion; but it will have been seen by the reader that, from my point of view, all reason is overwhelmingly in favor of the Marshall-Hall method, for no other known system fulfils so entirely the requirements of readiness and facility of application and completeness of result.

The removal of the cause of stertor so immediately changes the aspect of a case, that the question of blood-letting is at once solved in the clearest and surest manner. The truth is, as already stated, two separate conditions of the apoplectic state have been jumbled together and treated as one: the cerebral affection, and the condition of suffocation consequent upon it. As a respiratory impediment, pharyngeal stertor

may be regarded as equivalent to croup in laryngitis; the former is apoplexy plus suffocation, the latter laryngitis plus suffocation. We feel it necessary to relieve croup by a serious operation; whereas stertor is left to itself, although it may be relieved by merely changing the position of the body.

On referring to the literature of the subject, I have been astonished to find how difficult it is to draw any conclusions from the descriptions of the disease, or the treatment to be adopted. Authors are not agreed; and one of our most distinguished neurologists, in an article on apoplexy in a recent important work on medicine, appears to arrive at the conclusion that in apoplexy we can know nothing, we can foretell nothing, and we can do nothing. This confusion arises in a great measure from the stertorous breathing, converting all cases in which it is present into cases of apoplexy plus suffocation.

It is agreed that there are cases of apoplexy in which the face is pale and the pulse small, and in which bleeding is not to be thought of, and also that there are cases in which stertor is not present; but I cannot, with all my diligence, find out for certain, from any works that have been open to me, whether these two conditions—that is, the pale face and absence of stertor—were coexistent. There are no observations, as far as I know, made by any author as to the position of the patient in non-stertorous cases.

Suffocation, added to grave mischief in the brain, must of necessity affect not merely the symptoms and progress of cases, but also their mortality. Those only who have observed the extraordinary change on the removal of suffocative stertorous breathing, can judge how the diagnosis and prognosis are affected by it, and, not less so, the treatment and morbid anatomy.

Most modern writers on apoplexy adopt the general views of Dr. Abercrombie, and naturally, from the broad division of cases into sthenic and asthenic, are disposed to bleed in the former, and to avoid it in the latter; whereas, if we look upon the hard slow pulse as the result of the heart laboring to overcome an obstruction in the lungs (suffocation), we shall at once see that our first duty is to remove this obstruction, and thus simplify the case.

Heberden and Fothergill were opposed to bleeding in any case, and the latter has made some curious suggestions which pertain to the subject of this paper. He says that "even the hard, full, and irregular pulse, which seems imperatively to call for a very free use of the lancet, is often an insufficient guide, since it may be that struggle which arises from an exertion of the vires vitæ to restore health." From what has already been said, it will readily be guessed that I should say, "This strong pulse arises from an exertion of the vires vitæ to overcome vascular obstruction from gradually increasing suffocation."

Dr. Copland, in his "Monograph on Palsy and Apoplexy," presents to us the generally accepted views of apoplexy and its management up to the date of its publication in 1849, and the following extracts from that work will show how accurately symptoms had been observed, notwithstanding the absolute ignorance at that time of the exact part played by the physical states which give rise to stertor in the production of those symptoms. Throughout these extracts it is constantly seen how the weak, small pulse had been observed to be coincident with the absence of stertor; and the converse, that the full, strong, slow pulse was associated with the presence of stertor. He says:

"The patient is more or less suddenly seized with profound stupor, the eyes being either open or closed; the breathing is deep, slow, sonorous, or stertorous, and the pulse slow, full, hard, or strong—sometimes irregular or unequal. In this state of the disease, the above are often the chief symptoms, no signs of paralysis being observed." [11]

"In this variety of the disease, the patient falls down deprived of sense, consciousness, and voluntary motion; is like a person in a very deep sleep, with his face much flushed, tumid, or occasionally livid; his breathing slow, deep, and stertorous; his pulse full, natural in frequency, or slower than usual." [12]

"He had been blooded largely when I saw him. His breathing was not stertorous; his pulse was weak, small, and quick, and his countenance sunk. The brain, on a careful examination, presented no change in color or consistence, and was even less vascular than usual." [13]

"There are certain symptoms occasionally met with both in simple apoplexy and in apoplexy associated with palsy, to

which I shall briefly refer. The pulse is often full, strong, and slow, or of natural frequency in the first form of simple apoplexy, and in apoplexy associated with hemiplegia and occasionally in palsy passing into apoplexy. In other cases, and especially in those which are intense, and particularly in the second form of simple apoplexy, and in palsy which has passed into apoplexy, it is often small, feeble, and unequal or irregular. The respiration, both as to strength and frequency, generally presents similar characters with the pulse; when the latter is slow and strong, the former (is) deep, slow, and stertorous; and when the pulse is weak and frequent, respiration is quick, less labored, and much less sonorous. Deep sighs are occasionally observed in all the forms of the disease." [14]

Niemeyer, more than others among recent authors, has attempted to be systematic, and to clear away the confusion attached to apoplexy; but, like others, he fails, from not discriminating between the apoplexy and the suffocation. He believes that the shock and oppression of the apoplectic state arise from the anæmia of the brain-substance, from sudden compression of the cerebral capillaries. This anæmia is always seen after death, and is shown during life by the very symptom which has always had a contrary interpretation—"a remarkable pulsation of the carotids." This, instead of being a sign of increased pressure of blood to the head, really indicates that the flow of blood into the skull is obstructed "by the space," he says, "in the skull being affected, so as to prevent the escape of blood from the afferent vessels"—throwing the blood back, as it were, into the carotids.

As a consequence of this view, under the head of treatment, he says, "It is evident that, under some circumstances, venesection is a very useful remedy; under others it is very injurious, and the indications for it may be very exactly given. In order that as much arterial blood as possible may enter the brain, we must try to facilitate the escape of venous blood, without, however, diminishing the propelling power too much." (What a plea is this for removing suffocation!) Then he continues, "If the impulse of the heart be strong, and its sounds loud—if the pulse be regular, and no signs of commencing œdema of the lungs exist, we should bleed without delay. If, on the contrary, the heart's impulse be weak, the pulse irreg-

ular, and the rattling in the trachea has already begun, we may be almost certain that bleeding would only do harm, since the action of the heart, which is always weakened, would be still more impaired, and the amount of arterial blood going to the brain would thus be still more decreased."

CHAPTER VI.

STERTOR IN ANIMALS.

With the growth of physiology and our increasing experience, the "practice of physic"[15] appears, in a sense, rapidly becoming the "practice of physics." Pill and potion are steadily giving place to the judicious administration of air, exercise, hill-climbing, gymnastics, massage, kinesipathy, zanderism, *et hoc genus omne*—rest, position, surgical and medical appliances, hot and cold bathing, Turkish baths, the compressed-air cure, climate, with its different atmospheric pressures, from the cold and elevated regions of the snowy Alps in winter, to the warmer and more genial regions of the Mediterranean littoral and the Canary Isles.

What are these methods of treatment—in addition to the uses of heat, light, and electricity in their various forms and in varying degrees—but the practical application of the principles of physics to the disordered and diseased conditions of the animal body? Especially does this apply to the management of the apoplectic condition; for here most surely, as vital force diminishes, so do the laws of physics assert their sway. The paralytic limb, no longer amenable to the subtle forces of the patient's will, becomes the sport of forces from without, forces that will only yield to the return of what the ancients called the *vires vitæ*. As in man, so in animals, the same law obtains.

The following record of observations and dissections, undertaken to inquire into the subject of stertor in animals, will, I think, assist, with what I have already stated in reference to man, in demontrating instances of the reality of some of the changes above referred to.[16] "Fat as a pig," "sleeping like a pig," and "snoring like a pig," are expressions commonly used by the vulgar to illustrate conditions of a similar character in the human being. The aptness of these expressions was much impressed upon my mind by a visit to the Smithfield Cattle

Show. On entering the piggery I was greeted by a chorus of snoring swine; the air was full of stertor. There I saw before me, in perfection, fatted pigs, sleeping pigs, and snoring pigs. My mind, always on stertor bent, was at once exercised as to the cause of the great difference of sounds in the piggery and in the central hall. In the hall, as in the piggery, were animals as fat, and sleeping as profoundly; but not a sound of stertor was to be heard. I concluded that the difference depended upon a natural conformation of the soft palate and back part of the throat. It seemed, from what I saw and heard around, that snorers were omnivorous, non-snorers herbivorous. It was observable that the attitudes of the sleepers were somewhat different. The cattle and sheep were more prone in their sleep; the pigs lay more commonly on their sides. But this alone could not account for the great difference between noise and no noise. I noted that the two forms of stertor observable in pigs were, apparently, the palatine and the nasal; the palatine occurring in expiration as well as inspiration, the nasal only in inspiration. This was only what might have been expected, for the soft palate would vibrate with either current of air, whereas nasal stertor would only occur with insufflation and approximation of the alæ nasi. A very experienced herdsman told me that he had very occasionally heard a "beast," *i.e.*, an ox or cow, snore, and this I heard from an old shepherd is his experience with sheep. I have never heard a horse snore, but snoring dogs we all have heard, more in some breeds than in others.

The anatomy of the velum palati in horses and other domestic animals differs in some respects from that of man. In the horse, as stated by Professor Youatt, "the velum forms a perfect division between the mouth and the pharynx, so that although it yields and permits the food to pass under it in order to enter the pharynx, it prevents the return of the food; and the horse, except in the convulsive spasms of death, breathes and vomits only through the nose." The pig, like the horse, breathes ordinarily only through its nose, and, from dissections which I have made, I find the anatomy is very similar in the two animals, the base of the epiglottis being situated posterior to the velum; and as there is no, or only a very rudimentary uvula, the velum lies flat upon and, with its yellow elastic and muscular structures, firmly clasps the

upper surface of the tongue, just at the root of the epiglottis, entirely cutting off all communication between the mouth and the pharynx, except during the act of deglutition. The epiglottis almost entirely surrounds the opening of the larynx, and reaches around and outside the arytænoid cartilages. It stands high above that opening, and its upper edge is curled downward and outward; the tip projects also forward and downward. This arrangement would tend to prevent the liquid food upon which an animal of this age (six months) almost entirely lives, from either regurgitating into the nostrils or overflowing into the larynx; and would of necessity direct it, on its way to the œsophagus, into two channels, one on either side, between the sides of the pharynx and the sides of the epiglottis. The soft palate or velum is firm and strong, and, running backward from the uvula, meets the fibres of the opposite side, completely encircling the epiglottis and larynx, and forming at the upper opening of the œsophagus a strong sphincter-like band. Behind this is a pouch of considerable size, the utility of which is not at present to me very clear. Chauveau speaks of it as "a pouch immediately above the glottis, between the thyro- and crico-pharyngeal muscles." In front of the palate, the mucous membrane of the base of the tongue lies in large loose folds, permitting great expansion of this part of the buccal cavity during the passage of food.

In sheep, on the contrary, the soft palate does not reach to the tongue, and the epiglottis is situated slightly anterior to, and (when the animal is prone) at a lower level than the velum, thus enabling the animals to breathe through the mouth; and the food which is returned from the stomach by vomit or for rumination passes by the sides of the epiglottis and below the velum into the mouth.

Chauveau says that in sheep there is no arytæno-epiglottidean ligament, but I find very remarkable loose and free folds of mucous membrane running from the lateral edges of the epiglottis, on the outer sides of the arytænoid cartilages to their bases, and it occurs to me that they must form some protection to the larynx on the regurgitation of food during rumination. The posterior bands of the soft palate, instead of surrounding the epiglottis as in the pig, and forming a strong sphincter to the entrance of the œsophagus, become

much thinner, and appear to lose themselves in the sides of the walls of the pharynx; but doubtless the fibres of the palato-pharyngei muscles contained within these pillars follow much the same course as in man.

The narial and post-narial cavities are relatively much smaller in the pig than in the sheep, and it is the small size of those cavities and the fact of the epiglottis being confined in the pig to the contracted post-narial cavity that causes the animal to snore so profoundly during sleep, and of course, as fat accumulates in large quantities in the cellular tissue about the neck and pharynx, the post-narial cavity becomes more encroached upon and narrowed, and the unseemly noises are therefore more pronounced.

In oxen I find anatomical conditions very similar to those of the sheep, and I was fortunate enough to find, in an animal just slaughtered, some macerated food inclosed in a sort of gutter or tunnel between the arytæno-epiglottidean folds and the posterior pillars of the palate, showing the course the food was taking during the regurgitation of rumination.

The epiglottis of the ox is more curled downward and forward than that of the sheep.

In man the mouth, the tongue, the velum, and the muscles are not only used for the mastication and passage of food, but as part of the organs of voice and respiration, modulating the sounds in phonation and articulation. The velum does not reach the tongue, but hangs in mid-air, ready for the most delicate vibrations and movements of all kinds.

During my anatomical investigations of the relative positions of the various parts concerned in the production of stertorous breathing, I was struck by the differing forms of the epiglottis in many of my cases; eventually I found that the epiglottis differed in shape and position according to the age of the child or animal under investigation. In the sucking infant it is curled laterally upon itself backward, very convex in front, and concave behind; the chink of the glottis is relatively higher up and closer behind the epiglottis than in later life; and on either side, formed by the glosso-epiglottidean folds, is a little valley at a lower level than the glottis, so that the liquid food of the suckling is directed by the convex-fronted epiglottis into this valley, and thus prevented from going astray into the larynx (Fig. 9). The uvula, in the few cases I

have examined, exactly fits into the tip of the epiglottis, thus adding to the child's safety. As the child increases in age, the epiglottis expands laterally, and presents almost a plane surface toward the base of the tongue, and the chink of the glottis is, relatively to the epiglottis, lower down. As confirmatory of this, in marsupials the mothers have a provision for forcing their milk into the mouths of their young while they are in the abdominal pouches, as they are then too feeble to suck, and, to prevent the milk getting into the trachea, the larynx is drawn up to the back of the nostrils, while the fluid passes beside it into the œsophagus, so that the animal can continue breathing while being fed. I have reason to believe (from less extended observations) that in all mammals important developmental changes take place after birth. Independently of these changes being of scientific interest, they become, when understood, of real practical value; for I think it will generally be conceded that stertorous breathing, and the ill consequences of unnatural positions in health and disease, are much less likely to happen to the young and active than to the plethoric and those who are more advanced in life.

If sheep get, as they sometimes do, on their backs in a rut or ditch ("cast" or "mislaid," as it is called), they quickly die; and frequently, during the operation of shearing, sheep die suddenly, and no satisfactory explanation of this disaster has as yet been given. A friend of mine one year lost ten or twelve, and this year two or three, in this way; and he tells me that a friend of his lost forty at one shearing.

On December 14th, 1887, I took a sheep that had just been killed, placed it on its back precisely in the position it would rest in when "cast" or "mislaid," or when, if improperly managed, its belly was being shorn. After removing the side of the jaw, I carefully dissected out and displayed the exact positions of the tongue, soft plate, epiglottis, and larynx. I found the tongue on the roof of the mouth, and the epiglottis flat upon the velum palati, and the velum close on the posterior wall of the pharynx—as close as if it had been glued there; not a breath of air could have passed into or out of the larynx. It was quite curious to see how easily and completely the tongue and larynx, with their appendages, would render breathing in this position impossible. The animal, too, in its struggles to rise would bring its chin toward the sternum,

contracting the space in the pharyngeal cavity, and pressing the base of the tongue and the epiglottis more closely against its posterior wall, thus hastening its own death in its efforts to live.

In the horse, the cow, and the sheep (graminivorous) the tongue, pharynx, larynx, and wind-pipe, with their surroundings, though presenting marked anatomical differences, as I have already shown, are large and heavy, and very loosely connected with their fixed points. This gives freedom of movement to the head and neck for feeding purposes, and at the same time allows the afore-mentioned parts, when the animal is in its natural position, to fall easily away from the posterior wall of the pharynx, giving ample room for deglutition and respiration. On the other hand, when the animal is in a position exactly the reverse of natural, these anatomical conditions would necessarily permit the loose and heavy structures to gravitate toward the spine, and thus to act as impediments to those two functions (deglutition and respiration) in this class of animals more than others differently constituted.

Since writing this I have again, by introducing my hand into the throats, and by dissections on sheep and oxen, been able to verify my statement in every detail; so that what I had upheld on theoretical grounds must now be accepted as established fact.

From farmers, from shepherds, and from a great sportsman and acute observer, I learn that sheep "cast" or "mislaid," when found before death, make gasping, catching noises in their throats, as one of my informants expressed it, "choking-like;" the animals also froth at the mouth. After death the abdomen is immensely distended, and the flesh is black from venous engorgement; sometimes the ream (rumen) is found to be ruptured from the great distention. They die so quickly when quite on their backs, that noises in the throat are seldom heard; but when lying more on the sides of the back, the choking noises are always heard, if the animals are noticed in time. It is generally thought that the manner in which sheep are held is the cause of death in shearing; and quick, clever shearers manage to avoid this accident by having a care to the position. Keeping the animal fasting beforehand has not been found a sufficient precaution in preventing this form of death.

I have heard also of horses dying quickly when cast on their backs, as sometimes happens when they roll in the stables, and get their legs fixed under the manger or otherwise. Only lately one of my own horses was caught in this way, but happily my coachman was at hand. He found the animal in the greatest distress, profusely sweating, and making noises in its throat; and he had no doubt it would soon have died had it not been extricated from its difficulties. He told me that he had known a horse which had acquired a trick of getting cast so frequently that it had to be watched at night, until at last they strapped wooden blocks on each side of its body, which effectually prevented the animal from rolling. On the other hand, horses in the hunting-field at times get fixed on their backs in narrow ditches, and have remained so for some time without dying; so that the point requires in horses further investigation. Possibly, as a horse breathes only through its nostrils, the anatomical relations would explain the apparent contradictions.

Pathologically, animals as well as man are liable to stertorous breathing; but since the vocal organs are by no means so highly developed in animals, it naturally follows that the derangements are fewer, and sounds of an abnormal character do not so readily arise. Still, animals, like man, are liable to the various forms of stertor—buccal, nasal, pharyngeal, laryngeal, and mucus—either from temporary causes (such as catarrhs, strangles, diseased bones, abscesses, and their consequences), or from permanent causes, such as growths and tumors. But in the horse there are two special and notorious forms, "high-blowing" and "roaring." The former was once considered as a form of unsoundness, as it was supposed to be a rèspiratory impediment; but it was gradually found to be an expiratory sound, caused by the vibration of a large and loose nostril, and to be more or less trick and playfulness on the part of the animal, usually denoting spirit, courage, and powers of endurance.

"Roaring," on the contrary, is true laryngeal stertor, and is a much more serious matter. With the public all forms of throat-noises have been called roaring; but, although it is apparent that there are various forms and causes of stertor in the horse, it is stated, on the authority of the late Professor Spooner of the Royal Veterinary College, that ninety-five per

cent of the cases of "roaring" have their origin in paralysis of the laryngeal muscles on the left side—those muscles, in fact, which are supplied by the left recurrent laryngeal nerve. It has not, to my knowledge, ever been satisfactorily demonstrated why paralysis should be so exclusively confined to this particular nerve. A centric origin is not probable, and as the only difference in the two corresponding laryngeal nerves is that the left takes its course round the aorta, it seems probable that that fact alone accounts for the paralysis usually being confined to the left side. We should not be surprised at this, for we have a familiar example in man of such paralysis arising from aneurism and dilatation of the aorta, and from cancer and other growths in the chest altering the structure or interfering with the functions of the left recurrent laryngeal nerve. Moreover, when we consider the sudden and straining efforts during violent exertion and high speed to which horses are liable, and which are often enforced upon them when fatigued or out of health, we should naturally expect sudden alterations of size in the aorta, and therefore frequent stretchings of the fibres of the nerve, even if permanent dilatation of the vessel were not found to be present. I am bound to admit, however, that no pathological changes in the recurrent nerve or in the aorta itself have, so far as I have been able to find out, been observed by veterinarians in the common run of roarers. Dr. John Ogle, in a paper communicated to the Pathological Society on May 17th, 1859,[17] dealt somewhat fully with the subject of "roaring" in the horse, in reference to the alteration of the human voice, and the peculiar noise attendant upon the breathing in certain morbid states, wherein the pneumogastric nerve, or its recurrent laryngeal branch, were materially involved. He showed, as a specimen, a horse's larynx, from the museum of Mr. Field, the veterinary surgeon, in which (says Dr. Ogle) "the posterior crico-arytænoid muscle on the left side was seen to be in a very pale and completely dwindled state." The specimen was believed to be the one referred to in the following quotation from the "Veterinarian" for 1837 (Vol. X., p. 77), and reproduced in Dr. Ogle's paper.

"Having ascertained that the organs of respiration of a horse used for farm purposes were sound, I cast him, laid bare the recurrent nerve of the off side, and passed a ligature loosely

round it. He was then allowed to get up, and after a few minutes galloped severely without evincing the slightest defect in his breathing. The nerve was then drawn forward by the ligature, and one inch and a half of it excised; and immediately on only trotting the horse a short distance, such a degree of roaring was occasioned that, had the exertion been continued, he would soon have fallen. I kept this horse four years, and although his breathing became better, he always continued a sad roarer. At the end of that time I destroyed him for the larynx, which exhibited the usual condition of wasted muscles on the side deprived of the influence of the recurrent nerve." Dr. Ogle also gave numbers of quotations from Ruffus of Ephesus, Galen, Vesalius, Mundinus, down to modern writers, showing what various experiments had been undertaken for the purpose of proving the influence of the pneumogastric nerve and its recurrent laryngeal branch upon the voice and the breathing.

As before stated, in animals stertorous breathing is a prominent symptom of the apoplectic state: the paralyzed muscles have become amenable to physical rather than to vital laws. The pathology too of apoplexy, according to Professor Williams in his "Veterinary Medicine," in the horse at least, is identical, betraying, as in man, brittle vessels and disorganized brain-structure as the causes of the bloody effusion and broken brain-substance.

In cattle the only form referred to is the so-called "parturient apoplexy," a very grave and dangerous disease. In this, it is a curious fact that if the animals get on their sides, stertorous breathing supervenes, and death most surely follows in a short time. It is the practice, therefore, to prop them up with bags of straw, so that they rest in their more natural position on their breast-bones. On their sides, in this condition, food constantly finds its way into the larynx, and either quickly kills or gives rise to a form of destructive pneumonia and slower death with mucous stertor—a sequel more common to the dead-drunkenness and the apoplectic state of man than is commonly supposed.

CHAPTER VII.

OBSERVATIONS ON THE MAMMALIAN PHARYNX, WITH ESPECIAL REFERENCE TO THE EPIGLOTTIS.[18]

THE following communication embodies some notes and experimental observations incident upon my investigations upon stertor in animals. The figures which I give will be found to illustrate, in part, facts long recorded; but, as no good drawings of so familiar an object as the pig's epiglottis have hitherto been published, I supply the want, in the hope

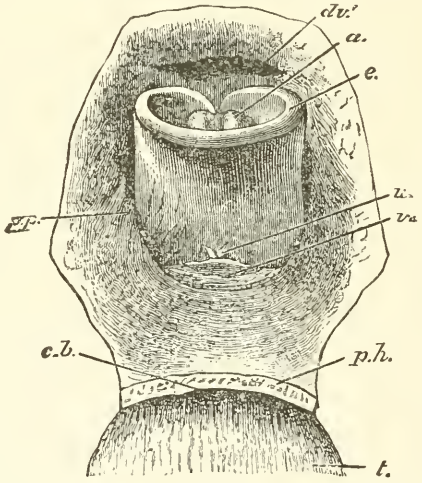

FIG. 5.—NARIAL PHARYNX OF EIGHTEEN-MONTHS' PIG, WITH EPIGLOTTIS IN SITU; FRONT VIEW, NATURAL SIZE. *a.*, Arytænoid; *c.b.*, buccal cavity; *d.v'.*, orifice of diverticulum retro-pharyngeum; *e.*, epiglottis; *p.h.*, cut edge of junction between hard and soft palates; *p.p.*, posterior pillar of soft palate; *t.*, tongue; *u.*, uvula; *v.*, velum.

that the figures proffered may be of service to workers in general.

Comparative anatomists have long ago shown that the characters and relationships of the velum palatinum and epiglottis are, in many quadrupedal mammals, widely different from those of the human subject. Youatt, writing of the

horse, says[19] the velum forms a perfect division between the mouth and nose, so that, although it yields and permits the food to pass under it in order to enter the pharynx, it prevents the return of the food, and the horse, except in the convulsive spasms of death, breathes and vomits only through the nose. The epiglottis of the adult pig is well known to lie, like that of the horse, above the velum (*e*, Figs. 5 and 6), and observation upon the living animal shows that normal respiration is carried on exclusively through the nose. On dissection of the pharynxes of the adult horse and pig a fundamental similarity in disposition of the parts is to be observed. (Most of the dissections upon which my observations are based

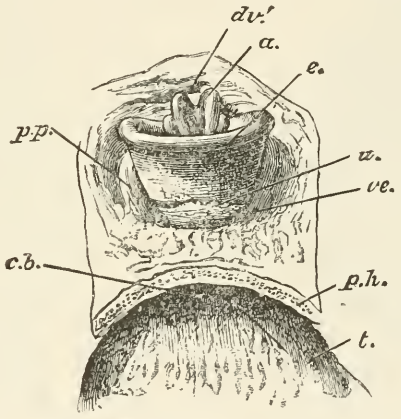

Fig. 6.—Narial Pharynx of Six-Months' Pig, with Epiglottis in Situ; Front View, Natural Size. References as for Fig. 5.

were made as follows: The head was separated from the trunk by cutting through the occipito-atlantal joint, care being taken that the parts about the pharynx were undisturbed, raphé being then divided along the middle line. In pigs it was found desirable to saw away the occiput before dividing the raphé.) The free border of the velum (which, in the last-named animal, bears an insignificant and vestigial uvula, *u*, Fig. 8) lies flat upon the tongue, and embraces the upper surface of the same at the root of the epiglottis, in such a manner as to cut off all communication between the mouth and pharynx except during deglutition. The enormous epiglottis is backwardly extended so as to almost surround the aditus laryngis. It stands high up above the level of the

arytænoids, and its free border is curled over antero-laterally, whereby its actual apex comes to look downward and forward (*cf.* figure).

An essentially similar condition of the parts is seen in the six months' pig (Fig. 6), except that the epiglottis is, in it, relatively shorter than in the adult, whereby the arytænoids, *a*, are more fully exposed. The arrangement of the parts is such as would tend to prevent the liquid food, upon which the animal up to this period almost entirely lives, from either regurgitating into the nostrils or welling over into the larynx. In front of the palate the mucous membrane at the base of the tongue lies in large loose folds, such as would permit of a great distention of that portion of the buccal cavity during the passage of food; and the parts generally are, in fact, so disposed and modified as to insure the transmission of the food along the sinus pyriformis, round the epiglottis, into the œsophagus.

The velum palatinum is powerfully developed, and it completely encircles the epiglottis and larynx, forming, at the upper extremity of the œsophagus, a strong sphincter-like band. Immediately behind this there opens a pouch of considerable size (*d.v.'*, Figs. 5 and 13). Chauveau speaks of it[20] as lying "immediately above the glottis, between the thyro- and crico-pharyngeal muscles." It extends back for some distance (*dv.'*, Fig. 8), and would appear to represent the diverticulum retropharyngeum of authors. (Albrecht has suggested that it may be a vestigial homologue of the piscine urine-bladder. *Cf.* Wiedersheim, "Bau des Menschen," p. 85, Freiburg, 1887.) Concerning its function I have nothing to communicate.

Rückert has recorded the intra-narial condition of the epiglottis in the sheep (*cf.* Howes, this volume). I find, however, that the same varies in position with animals resting in different positions, and that ordinarily the soft palate does not reach the tongue, while the epiglottis is situated anteriorly to, and (when the animal is prone) at a lower level than, the velum.

Chauveau asserts[21] that in ruminants there is no arytæno-epiglottidean ligament. I find, however, in an analogous position, a couple of free folds of mucous membrane (*f*, Figs. 7 and 8).

These structures are, in life, remarkably loose and elastic; they run from the lateral edges of the epiglottis along the outer sides of the arytænoids to the bases of the same, and I conceive of them as functional in protecting the larynx during the regurgitation of food in rumination.

Turning now to the human subject, we find that, in the adult, the velum does not reach the tongue. In addition to its function in alimentation, the former is here an important

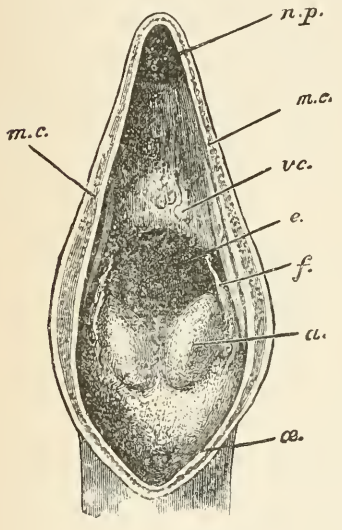

Fig. 7.

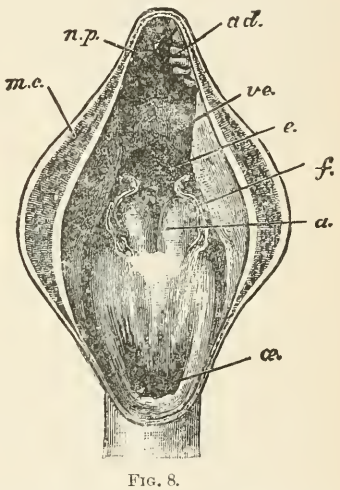

Fig. 8.

Fig. 7.—The Larynx and Narial Pharynx in the Adult Sheep, seen from behind; the Constrictors of the Pharynx having been Divided down the Raphé. References as for Figs. 5 and 6. *f.*, Mucous fold; *m.c.*, constrictor pharyngei muscles, cut edges of; *n.p.*, posterior nares; *œ.*, œsophagus.

Fig. 8.—The Larynx and Narial Pharynx of an Old Lamb, seen from Behind; Natural Size. References as before. *ad.*, adenoid growth.

accessory to respiration and vocalization; and it hangs, as it were, in mid-air, ready to respond to the most delicate vibrations and other movements.

I have been struck, in the course of my work, with the fact that, while much has been done with the comparative anatomy of the adult mammalian larynx, but little attention appears to have been paid to variations and differences due to age in any one case. In the course of my researches into the relative positions of the various parts concerned in the production

of stertorous breathing, I was early struck by the different forms of the epiglottis in many of my subjects, and I ultimately found that this organ differs in shape and position in accordance with the age of the child or quadruped under investigation. In the sucking infant it is curled laterally upon itself, being very convex in front and concave behind; while the rima glottidis is situated relatively higher and closer behind the epiglottis than in later life. The glosso-epiglottidean folds are so disposed as to inclose, on either side, a valley, which lies at a lower level than the glottis; by virtue of the convexity of the front face of the epiglottis, the liquid food of the suckling is directed into the same, being thus prevented from entering the larynx. The uvula, in the few cases which I have examined, fits exactly into the excavated summit of the epiglottis, and the whole condition of the parts suggests an

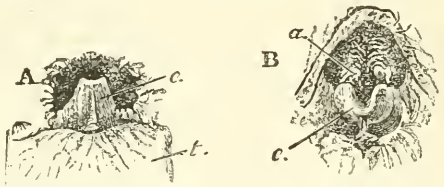

Fig. 5.—The Human Epiglottis and Larynx at Twelve Months. *A*, Front view; *B*, top view. References as for previous figures.

approximation toward that so well known to be realized in the developing marsupial while within the pouch.

As the child ages, the epiglottis expands laterally, and presents an almost plane surface toward the base of the tongue. At the same time the rima glottidis comes to lie, relatively to the free border of the epiglottis, lower down.

I have, from dissections, long been familiar with the fact that at birth, before the child has breathed, not only is there no air-cavity in the chest, but there are no such cavities in the pharynx, mouth, or nares. The various walls and adjacent surfaces are all in close apposition; the base of the tongue lies against the posterior wall of the pharynx, and its upper surface against the palate; the uvula lies behind and against the epiglottis: and the soft walls of the nares, lined with mucus, are all in close contact and impermeable to air. The first reflex action has for its object the dilatation and opening up of these cavities by forcible separation of their re-

spective walls; but for some months afterward the palate lies near the upper surface of the tongue, and the uvula is capable of being brought into apposition with the epiglottis.

On passing from the human subject to the quadrupedal mammal (pig), some important and unexpected differences are to be noted in the correlation of growth and the relationships of the maturating epiglottis and velum palatinum. In the sucking pig, soon after birth, the epiglottis is to be found in the mouth, below and considerably anterior to the soft palate, while it does not so far encircle the laryngeal orifice as in later life. The soft palate is less elongated than in the older animal, and the uvula is bifid. The conditions appear to be identical in the fourteen-days' animal (Fig. 10) and at this stage the

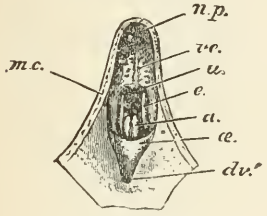

Fig. 10.

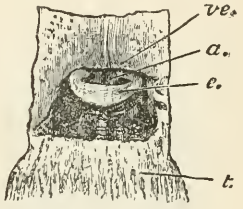

Fig. 11.

Fig. 10.—The Narial Pharynx of a Two-weeks' Pig Dissected from Behind, Natural Size. References as for Figs. 5–8.

Fig. 11.—The Velum and Epiglottis of a Six-weeks' Pig, Front View, Natural Size. References as for Figs. 5–8.

diverticulum retropharyngeum (*d.v'.*) is well developed and proportionately as extensive as in the older pig.

I have already shown (p. 781, Fig. 6) that at six months the epiglottis lies, in this animal, wholly within the narial pharynx, the relationship between the two being exactly in accord with those of the adult. My assistant, Mr. Stainer, has introduced his hand into the pharynx of many pigs of six months and upward, and has always found the velum to lie anteriorly to (below) the epiglottis and firmly clasping its root. This being so, I was not a little surprised to find that in one animal (said to be five months old) the epiglottis (*e.*, Fig. 12) lay much more within the buccal cavity than I should have anticipated.

In the six-weeks' specimen (Fig. 11) the soft palate is seen to have curled in the sides of the epiglottis in such a manner

that half of that organ lay in the mouth and half in the narial passage. In the fourteen-weeks' specimen (Fig. 13) (the relationships of the parts of which have become somewhat disturbed by repeated manipulation) the relations were much the same, except that a considerably greater portion of the epiglottis was seen to lie in the narial passage. It will be observed that the two last-named animals would appear to be, with respect to general relationships of the parts concerned (as in age), transitional between the earlier and later stages

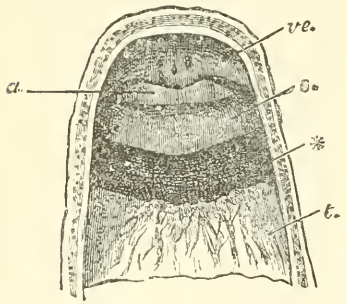

Fig. 12.

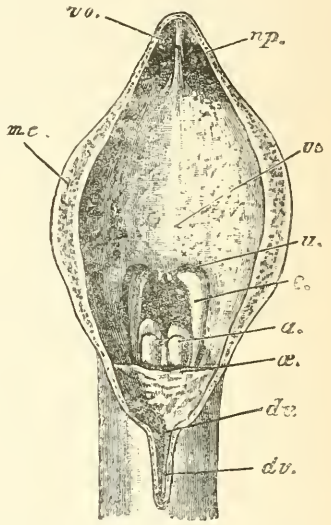

Fig. 13.

Fig. 12.—The Velum and Epiglottis of a Five-Months' Pig; Front View, Natural Size. References as before.

Fig. 13.—The Narial Pharynx, Larynx, and Posterior Nares of a Fourteen-weeks' Pig, seen from Behind. The diverticulum retropharyngeum (*dv.''*) has been opened up for its whole length. Natural size. References as for other figures. *vo.*, vomer (posterior edge of nasal septum).

here dealt with, and the facts suggest the probability that it is within the fifth to sixth month of extra-uterine life that the pig's epiglottis finally becomes intra-narial. Further inquiry is requisite for the settlement of the question; but it is clear, from the facts delineated in Figs. 5 and 6, that after the sixth month the epiglottis continues to elongate, whereby it ascends the more completely into the narial pharynx.

I have examined a series of different forms, with a view of ascertaining how far the facts above recorded for the pig

might be typical of the leading mammalian orders. I am unable to detect between either the lamb and full-grown sheep, or the calf and ox, any such remarkable differences as those noted for the pigs. It might reasonably be expected that in each order a definite type of structure and relationship of the parts under consideration would be discernible. So far as my investigation carries me, this is not the case; for while the arrangement and relations of the palate are, in a series (horse, pig, rabbit, Guinea-pig, and others), similar, the shapes of the epiglottides vary considerably in each member of the same at corresponding ages.

I am able to confirm Howes' observation concerning the intra-narial condition of the rabbit's epiglottis. When the head is dissected from behind, in the manner which I have adopted, this becomes very striking. It has occurred to me to put the matter to the test of experiment in its bearing upon respiration, and I accordingly stopped up the nostrils of this animal for a short period during life. I found that the creature was, for the time being, quite unable to breathe through its mouth. I have repeated this experiment upon full-grown pigs with a similar result (I saw this experiment performed, for purposes of safety, upon a violent horse while in Paris during the slippery weather of last year. A large chestnut brougham horse had got his legs entangled between the broken shafts and harness of another horse; in his terror he plunged and kicked most violently, and nothing appeared to be possible to save both animals from destruction, until the coachman got own from his box and grasped the chestnut's nostrils. The animal was at once subdued, and he gradually fell senseless to the ground, remaining there while the harness was cut, and all danger removed. The knowledge of the fact that pressure on the nares will stop the breath in horses is practically utilized in an invention for stopping "bolters" by an arrangement of pads to the nostrils, which can be closed at the will of the rider) and I am inclined to believe that the condition of the epiglottis described by Howes is the normal one for the rabbit.

In addition to the foregoing, I append some notes of a more general nature, in the hope that they may be of service in the further study of the co-ordinate functions of the great cavities and organs related to the mammalian pharynx.

A horse, as we have seen, cannot breathe or vomit through the mouth, but does it neigh through the mouth or nostrils? A pig snores or grunts ordinarily through the nose, but who has not heard this animal squeal through its mouth? A lion ought not (if the anatomy of the pharynx in a six-weeks' specimen in Professor Cleland's series at Glasgow is typical; the arch of the palate clipped the root of the epiglottis in front, like that of the horse or full-grown pig) to breathe, vomit, or emit noises by the mouth; and yet a friend of mine, probably one of the greatest lion-hunters of the age, assures me that lions open their mouths with their heads low down and appear to roar through the former. When they attack, however, they throw up their heads and emit sudden yelps like a dog. Dogs appear to breathe in ordinary through the nose; they can, however, by volition, breathe as efficiently through the mouth.

Since writing the above, I have elicited the information that horses when much excited neigh through the mouth. I have, morever, experimented again on the full-grown pig by stopping up its nostrils for a short time, and have found that, although it does not appear to be capable of inspiring by the mouth, it can yell and shriek through it most terribly—shrieking being, of course, the result of an expiratory effort. The same explanation may perhaps apply to the horse and lion.

I believe that physiologists have experienced difficulties in conducting certain investigations upon the rabbit while supine. I have dissected two rabbits in this position, and find that they would probably have died from the cause alluded to above had they been fixed in supination. I have already dealt with the cause of stertor in man, and with the fact of it being so common in swine. I submit, finally, that the great development of the epiglottis in many of the "dumb" animals is opposed to the view which now tends to prevail, that the epiglottis is not primarily protective of the opening of the larynx.

CHAPTER VIII.

EXPERIMENTS ON POSTURAL RESPIRATION.

COMMUNICATED BY MARSHALL HALL, M.D., F.R.S.

To the Editor of the Lancet:

SIR:—I am indebted for the following able and careful experiments to Mr. R. L. Bowles, of St. George's Hospital. I think they render any further repetition of them unnecessary, fully confirming as they do the first very accurate investigations of Mr. Fox.

I am, sir, your obedient servant,

MARSHALL HALL.

LONDON, October, 1856.

DEAR DR. MARSHALL HALL:—The inclosed experiments, to each of which I have appended a few remarks, were made by Mr. Hunter and myself, the object being to confirm or correct those previously made for you by Mr. Fox and ourselves, feeling that, from our former experience, we could now guard against several fallacies likely to arise during the experiments. The mode of procedure was the following:

An India-rubber tube was inserted into one nostril, the opposite one, with the mouth, being closed, and rendered air-tight by plasters, bandages, etc.; the free end of the tube was now attached to a glass siphon, containing a small quantity of water in its bend, and to the opposite end of this siphon was fastened an oiled-silk bag, made in the form of an intestine, to which it was similar in appearance and calibre when inflated. This bag, when full, contained forty cubic inches. The water in the siphon acted as an index of the direction of the air in its passage to or from the bag, or, as we have called it in the experiments, one oiled-silk tube. It was the amount of air expired into this tube on pronation, etc., which enabled us to compare it with the natural expiration of thirty inches;

for when the tube was half filled, which was easily proved by pressing the air toward its closed extremity, we inferred that we had twenty cubic inches in the tube, and so on. We did not pretend to perfect accuracy as to the amount, but it must be an exceedingly near approximation to the truth.

I think you will also see in these experiments proof that, though the supine position does not in every case prevent the passage of air, it does so in a large proportion of cases; and if it do so in one case only, that appears to me quite reason enough why that position should be avoided.

Believe me, faithfully yours,

ROBERT L. BOWLES.

EATON PLACE SOUTH, Eaton Square, 1856.

SUBJECT 1.

A male, much emaciated, about fifty years of age, and six feet in height. The body was not quite cold, and cadaveric rigidity had but partially come on. He had been dead ten hours. The apex of the tongue reached the incisors, and the body of the tongue was at the floor of the mouth, so that a considerable space existed between its surface and the roof of the mouth. Some fluid was seen at the back of the fauces, and on laying the body on its face a large quantity of fluids and solids from the stomach made their escape.

Experiment 1.—Semirotation, prone and lateral. In the former position the tube was quite half filled, and in the latter it was instantly emptied.

Experiment 2.—By the alternate pressure and relaxation on the thorax (the subject supine) the same result was obtained as in Experiment 1.

Experiment 3.—Semirotation, prone and lateral, was again had recourse to, and with the same result as before.

Experiment 4.—Alternate pressure and relaxation on the thorax in the supine position. This time not the slightest inspiration or expiration could be obtained.

On removing the coverings of the mouth the tongue was seen to be in the same position as when we commenced, but there was again fluid in the pharynx.

Remarks.—This case demonstrates how (in the supine position) fluids in the stomach might interfere with respiration,

for, in Experiment 2, a good result was obtained, no fluid being in the pharynx, but after the further movements of Experiment 3, more fluid, etc., had been ejected from the stomach, thereby filling up the pharynx and totally preventing the passage of air into or out of the trachea. This case also shows that the epiglottis does not in all cases cover the glottis in the supine position, though in a large majority it would appear to do so.

Subject II.

A middle-aged man, very much emaciated, having suffered for a long time from abscess of the brain. Rigor mortis still present. The brain had been removed.

Experiment 1.—Alternate pressure and relaxation on the thorax (body supine); no effect.

Experiment 2.—On pronation about one-third of the tube, on applying pressure nearly the whole tube, was filled; on removing the pressure the tube was emptied to one-third, and on resuming the lateral position it was quite emptied. These movements were several times repeated, and invariably with the like series of results.

Experiment 3.—Experiment 1 was repeated. No effect was at first produced; but on pressure being applied by a sudden jerk some obstacle seemed to be removed, and expiration was the result to such a degree that the tube was nearly filled, as in Experiment 2; and on removing the pressure the corresponding amount was inspired. After this, alternate pressure and relaxation in the supine position produced inspiration and expiration with ease. On removing the tube no obstacle was to be seen in the pharynx.

Remarks.—Experiment 1 proves that in the supine position something does at times prevent respiration in the dead subject; and although in Experiment 3 respiration was produced in this position, it could not be done at the commencement; some obstacle had first to be overcome, probably adhesion of the epiglottis to the back of the pharynx by viscid mucus, as the following observation would tend to prove: On cutting down and removing the right side of the pharynx, with the corresponding halves of the hyoid bone and thyroid cartilage, in another subject, a tolerable view of the position of the parts was obtained. The epiglottis was in direct apposition, by its

laryngeal surface, with the posterior wall of the pharynx, so as quite to preclude the possibility of the passage of air; when, however, the head was allowed to hang backward over the edge of the table, the bending of the cervical vertebræ caused the posterior wall of the pharynx to recede from the epiglottis, so allowing free passage of air. If the tongue had been drawn forward, would the epiglottis have been removed from the pharynx? or would the prone position cause it to fall forward? Experiment 3 differs from any we have yet had, in so small an amount being expired in this prone position without pressure. The only reason we could see for this was the removal of the brain; for in all previous experiments we had allowed the head to hang over the edge of the table in the prone position, so that the weight of the head, dragging on the thorax, must have had considerable power in expelling air from the lungs; whereas, in the case before us the weight of the head was lost (the brain having been removed). As a further proof of this, when weight was added to the head, the amount of expiration on pronation, without pressure, was very considerably increased.

Subject III.

A middle-aged man, very short and emaciated; had suffered from extravasation of urine. There was some dulness on percussion on the left side of the chest; rigor mortis present; tongue very stiff, and moved about with difficulty. While the body was being shifted we could distinctly hear the rushing in and out of the air.

Experiment 1.—Very good result (more than half the tube) from pressure in the supine position.

Experiment 2.—The arms were folded beneath the forehead and fastened there by bandage. On pronating the body nearly one-third the tube was filled, and on applying pressure a little more than one-third.

Experiment 3.—As a considerable portion of the chest was (by the arms being folded beneath the head) raised from the table, a block was so placed that, on pronation, the thorax should rest upon it. No better result, however, followed this than in Experiment 2, except that by pressure the tube was now nearly half filled. On resuming the lateral position the tube was of course emptied as usual.

Experiment 4.—The head was allowed to hang over the edge of the table, as in all our previous experiments; and now the tube was more than half filled (as in Experiment 1) on pronation, with the addition of a little pressure.

Experiment 5.—Pressure in the supine position produced the same result as in Experiment 1. On removing the tube the fauces were quite clear, and free from fluid.

Remarks.—As in Case I. and II. of the present series, experiments 1 and 5 were exceptions to the general rule. Even though the tongue had been moved about so as to relax it as much as possible, it did not drop back into the fauces, on account of its excessive stiffness. The reason of the but partial success in Experiment 2 was clearly from the large portion of the chest which was prevented from coming in contact with the table; and the result of Experiment 3 being no better, even though a block was placed beneath the chest, would doubtless depend upon the weight of the upper part of the body, which is necessary for the proper expulsion of the air, being conducted away through the medium of the spine to the lumbar region. In Experiment 4, when the chest came well in contact with the table, the result was as usual.

Subject IV.

A middle-aged man, had suffered some time from a purulent discharge from the side of the chest, with which cavity the opening was supposed to communicate; and there was considerable dulness on percussion over the same side of the chest. Rigor mortis less marked than usual; the tongue had dropped back into the pharynx, but it could not be accurately ascertained whether it quite stopped the way or not.

Experiment 1.—Pressure on thorax (supine); no result whatever.

Experiment 2.—Prono-lateral movements, with the head on the table; a little more than one-third the tube, but increased by pressure to nearly one-half.

Experiment 3.—Prono-lateral movements, with head hanging over the edge of the table; nearly half the tube full, which took place very readily at first, but afterward more slowly. On taking out the tube, grumous fluid from the stomach was found in it. After this was emptied out, the experiment was

repeated, and the air now passed in and out as easily as at first, so that the tube was nearly half filled.

Experiment 4.—Pressure on the thorax (the body supine); no result, after repeated trials. It being observed that the abdomen was very lax, and so interfering with the amount expired from allowing the diaphragm to descend, a binder was applied, but a large quantity of the same fluid as before was ejected from the stomach into the tube. The subject was pronated, and the fluid allowed to run out from the tube and pharynx.

Experiment 5.—The arms were folded beneath the chest, and the prono-lateral movements employed, but with very little result.

Experiment 6.—Pressure in supine position; no result. On removing the tube the body of the tongue was far back in the fauces, but no fluid could be seen.

Remarks.—It was difficult to say whether it was the tongue or fluid in the pharynx that prevented the passage of air when the subject was supine; but the tongue was much more movable than in previous cases, and therefore farther back. It was evident in Experiment 3 that the fluid was the cause of the difficulty. Experiments 2 and 5 were much inferior to Experiment 3. The amount of air expired was in all these experiments less than usual, probably from the disease of the chest.

Congenital Malformation Causing Stertor and Death.

The following case occurred while this book was passing through the press.

On May 6th, 1891, Dr. Frederick Eastes was kind enough to bring to my notice an infant, two days old, with a singular malformation of the lower jaw, entailing such changes in the relations of the soft parts as caused the death of the child from suffocation on the day following my visit.

The case was typical of the dangers arising from the shortening of the distance between the symphysis of the jaw and the posterior wall of the pharynx (*vide* Figs. 1, 2, 3, and 4), as will be seen from the following notes kindly supplied to me by Dr. F. Eastes:

"The soft palate was almost entirely wanting. The lower

jaw was one inch behind the upper, in consequence of the body of the bone running transversely from one ramus to the other, without any forward projection. The tongue was directed upward, so that only its under surface could be seen. The tip fitted exactly into the cleft of the soft palate, and would come no farther forward. There was no proper existing pharyngeal cavity, as it was entirely filled up by the body of the tongue, so that inspiration was almost impossible. Occasional stertorous inspirations occurred which would be repeated many times, and then respiration would entirely cease for several seconds. The cry was faint and feeble, mainly in consequence of the deficiency of the pharyngeal cavity. It could not take the breast, and it was doubtful if it swallowed anything at all; attempts at swallowing always brought on suffocative symptoms. Change of position did not alter its difficulties, the tongue could not fall forward, as it was fixed by the abnormal jaw.

"*Post-mortem Examination.*—The inferior maxilla was natural as to the ramus and as to its breadth, but the horizontal portion or body of the bone came almost directly across from one ramus to the other, so that the anterior surface of the symphysis was only a quarter of an inch in front of the anterior border of the ramus. The hyoid bone and hyoid and cricoid cartilages were all lower than usual, the cricoid being on a level with the top of the sternum."

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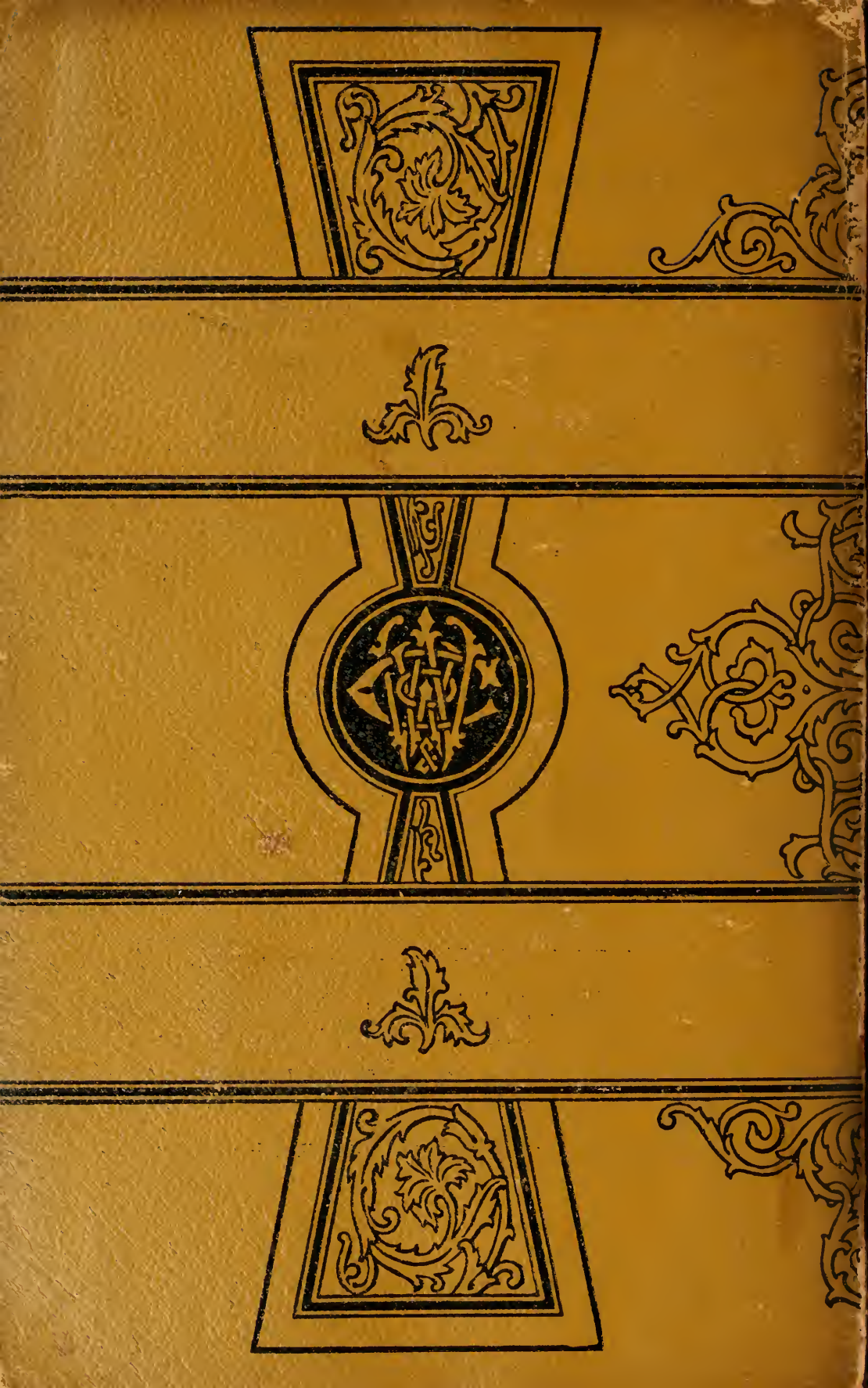
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